PULP & PAPER

MAY 1960

Cost Cutting Success
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Mead's New Bleach Plant
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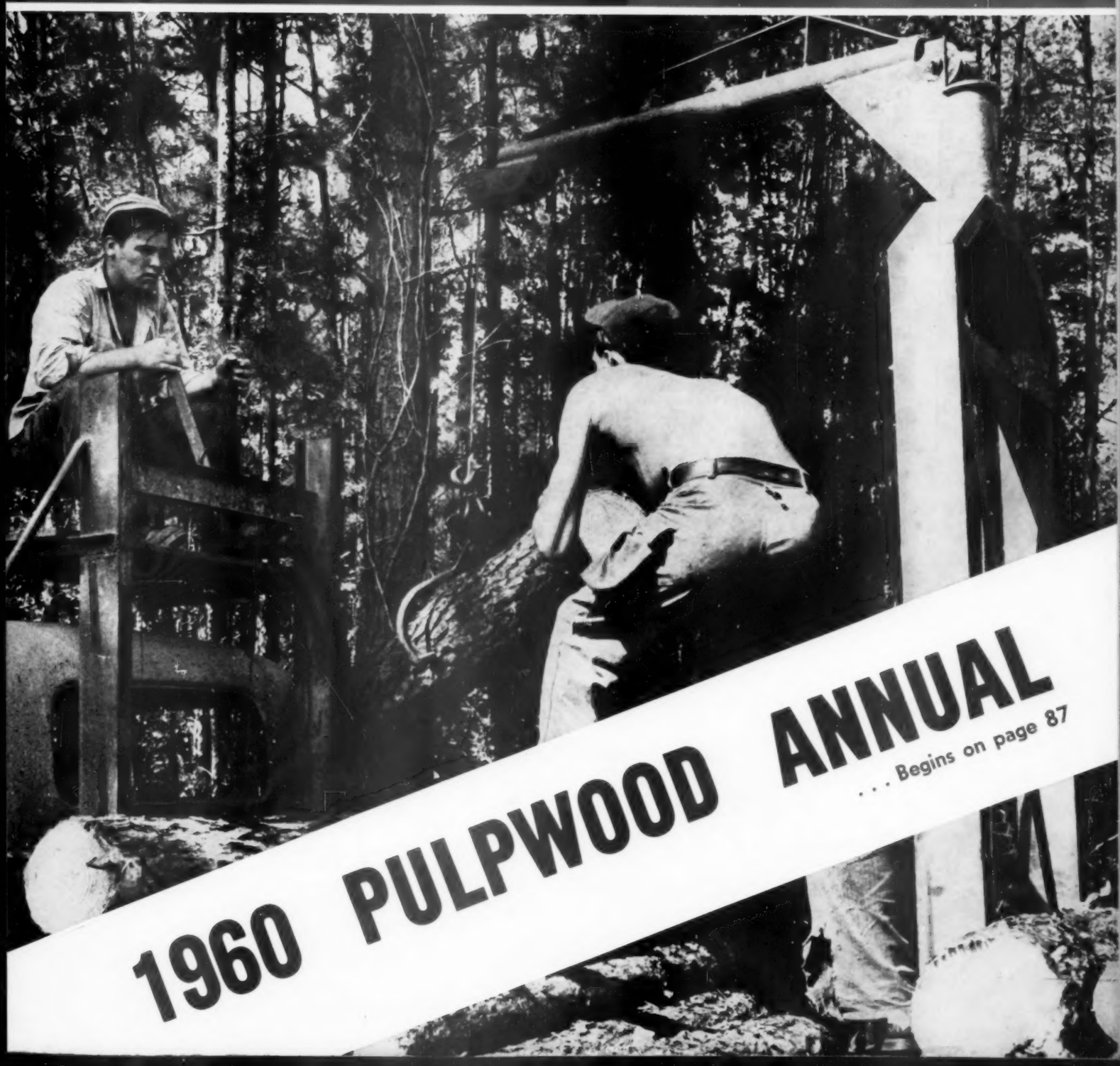
Stainless Steel Castings
page 67



1960 PULPWOOD ANNUAL

. . . Begins on page 87

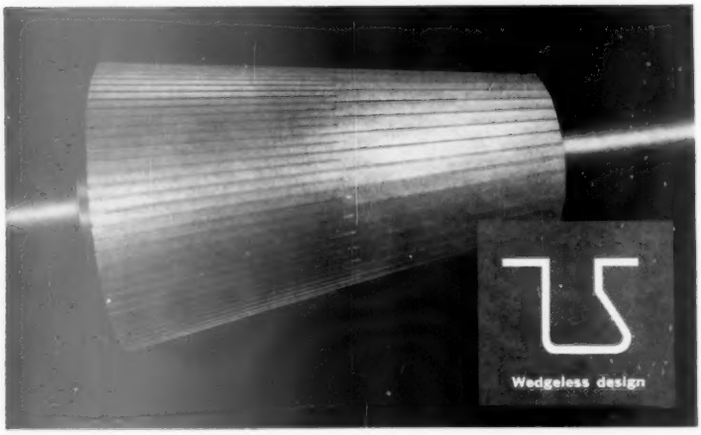
ONLY EMERSON WEDGELESS PLUGS CAN PASS THIS TEST

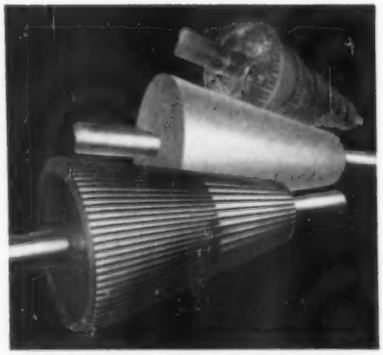
- because only Emerson Plugs have these design advantages!

Before You Buy Another Jordan Plug Check the Answers to these Questions

Question	Emerson Wedgeless Plugs	Other Plugs
Are plugs available in stainless steel?	YES	NO
Are plugs easy to strip and fill because of bandless construction and only one knife to a slot?	YES	NO
Can a full range of knives — both single and duplex — be used interchangeably in the same plug?	YES	NO
Does the design provide impact cushions between the base of the knives and the bottom of the slots?	YES	NO
Is there ¾" of wear depth available on all knives for long periods of Jordaning?	YES	NO
Can used plugs be jacketed with stainless steel?	YES	NO
Do bars have the advantage of Microlyzing based upon 40 years experience in custom heat treating?	YES	NO

These exclusive features are found *only* in Emerson Wedgeless Plugs. In addition, the unique design of Emerson Plugs gives you precision milled, equally-spaced slots so that when the plug is filled, *all* stock gets thorough, uniform treatment over the entire plug surface. Metal-to-metal contact in the slots adds strength and supports the knives their entire length.





Hundreds of mills have gained the advantages of Wedgeless Plug design by having their used plugs jacketed with Stainless Steel through Emerson's patented process.

DURABILITY UNMATCHED

When it comes to wear resistance and durability, try matching the high tensile strength of materials used in Wedgeless Plugs with those of other plugs: Special Stainless Steel — 125,000; Fabricated Steel — 75,000; Cast Iron — 57,500. For additional plug strength, a hammered forged steel shaft is pressed into the Emerson plug body under 60-ton hydraulic pressure. No wonder Emerson Wedgeless Plugs are stronger — more durable and serviceable than any other plugs — and specified by more papermakers.

Over thirty years ago Emerson Wedgeless led the field in Jordan plug design. It still leads today. It has never been equalled. Use Emerson Wedgeless Plugs. Buy the best. Save money, time and trouble. You have a choice of cast or fabricated plugs . . . Stainless Steel Jacket on Cast Steel body . . . Stainless Steel Jacket mounted on your old plug. *And remember, of the hundreds of used plugs jacketed with stainless steel,* ***not one has ever failed in service.*** For full information, write.

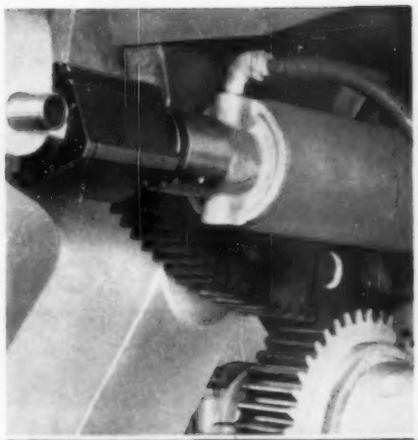
An exclusive product of

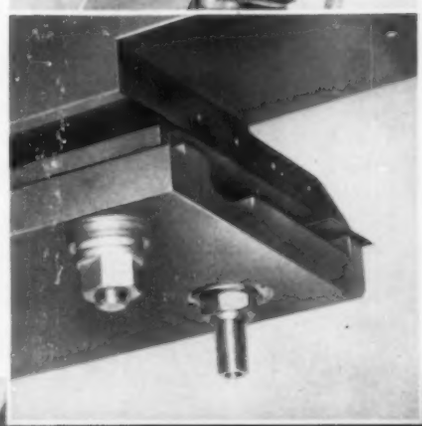
BOLTON EMERSON

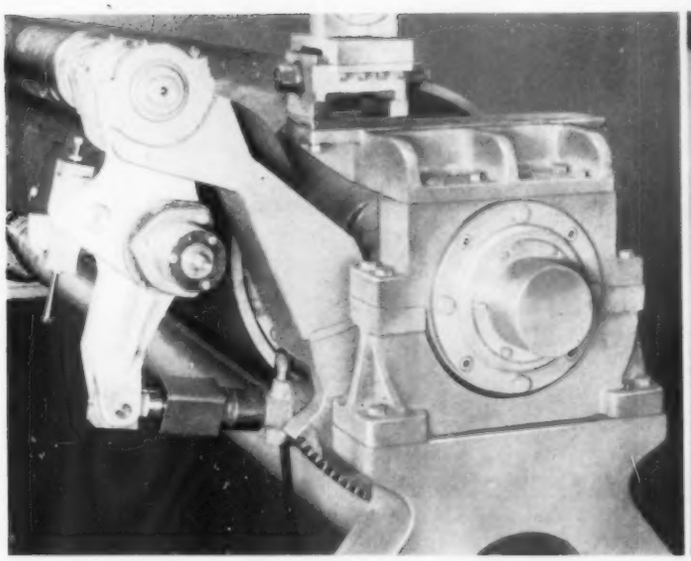
The Emerson Manufacturing Co.
Division of John W. Bolton & Sons, Inc.
Lawrence, Massachusetts

Only the **NEW** Rice Barton Trailing Blade Coater gives you **ALL** these advantages!

- Less blade wear-in time
- Less paper waste
- Accommodates different thickness blades
- Instantaneous blade and holder removal
- Blade adjustable by micrometer
- Coat weight control while running
- Positive head positioning
- Easier cleaning of all coating surfaces
- Faster speeds
- Less floor space
- More rugged construction







Completely redesigned for greater versatility and ruggedness, the changes are major improvements not just modifications of the original. Rice Barton engineers have combined the best features of everything learned from extensive research, continuous development and more experience than any other manufacturer.

PROGRESS IS MEASURED IN RESULTS—NOT CLAIMS. Rice Barton's results are over 60 commercial installations!

Write for Descriptive Folder.

RICE BARTON

Rice Barton CORPORATION • WORCESTER, MASS.

FOURDRINIERS, PRESS SECTIONS, DRYER SECTIONS, CALENDERS AND SUPERCALENDERS, REELS, WINDERS, HEAD BOXES, SIZE PRESSES, BREAKER STACKS, DIFFERENTIAL DRAW CONTROL DRIVES AND CONE PULLEY DRIVES, PULPING EQUIPMENT, HIGH VELOCITY AIR DRYERS, TRAILING BLADE COATERS, FIBRE-FLASH DRYING SYSTEMS

When You Want To Screen . . .

BIG VOLUMES

OF

HIGH CONSISTENCY STOCK

THROUGH

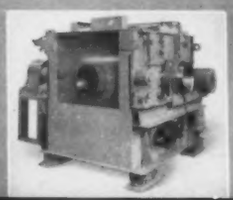
SLOTTED PLATES

IN

SMALL SPACE

AT

LOW SCREENING COST PER TON



Specify . . .

BIRD VIBROTOR SCREENS

for example:

60 tpd of 1.7% unbleached sulphate through .012" slots

90 tpd of mixed pine and short fibred stock through .012" slots

86 tpd of 1.7% semichemical board stock through .018" slots

148 tpd of 1.9% deink through .012" slots

— all through a single Vibrotor Screen that takes less than 150 sq. ft. of floor space

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MACHINE COMPANY

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PULP & PAPER

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57 Cost Cutting Program Succeeds

Rhinelander Paper Co. finds that cost control is pre-requisite to cost reduction and after an 18 months program reduced waste by 43% and boosted machine efficiencies by 10%. Program is outlined in exclusive story by John Kay (picture) and many mills will find it of value.

60 Modern 4-Stage Bleach Plant

The Mead Corp's. new bleach plant was built to meet exacting requirements of its important coated paper and white paper mill in Chillicothe, Ohio and in addition to including a chlorine dioxide bleach sequence has many unusual features.

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Truck loading in the South (cover picture)

For the 6th successive year, PULP & PAPER presents exclusively the complete papers of the Annual American Pulpwood Association meeting. This is not only of prime interest to woods managers, producers and foresters, but also to top management and supervisory executives throughout the pulp and paper industry.

Good forest management and practices are of increasing importance to every person working in this industry. Mill technical and research men are working more closely with forest scientists and planners.

Highlights of this year's PULPWOOD ANNUAL:
New information about hardwoods—their importance to fiber-hungry nations. New reports on those great controversies—multiple land use and the Wilderness Bill. Reports on improved logging practices in all sections of the U.S.A.

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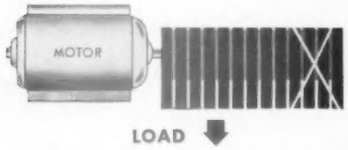
B.F.Goodrich V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

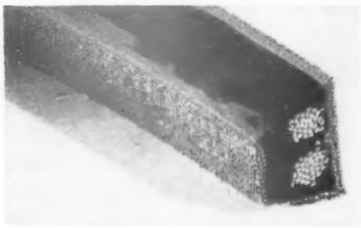
BFG V belts have 40% greater horsepower rating, cost no more

All B.F.Goodrich V belts now have 40% greater horsepower rating. This higher capacity rating was formerly found only in high capacity belts, but now costs *no more than former standard belts.* This means that lighter, more compact, and lower cost drives can now be used, because these B.F.Goodrich belts carry the horsepower needed for efficient drives using fewer belts at standard belt prices.



9 V belts can now do work of 13.

What caused these failures?



Answer: Prematurely worn sides are caused by grit, dirt or any such abrasive contact. Misalignment often causes wear on one side only. To prevent, align the sheaves, checking with straightedge or cord. Keep belts and sheave grooves clean.

Answer: Belt put on improperly, or foreign objects fell into groove to rupture cover fabric. To prevent, move motor toward driven sheave when replacing belt. If rupture was caused by foreign object, protect belts with a cover.

BFG double matching program keeps V belts matched during the life of the drive

Double-matching assures you that a set of B.F.Goodrich V belts are of equal length when installed and will stay uniform in length for the life of the belts. When V belts of different lengths are put on the same drive, longer belts loaf, while shorter ones carry all the load and fail quickly. B.F.Goodrich double-matched belts are measured *twice* for uniform length, once when manufactured and again after storage. Only belts that are of equal length when manufactured and after storage are grouped into sets.

Belts that are grouped into sets are tied together with a tag which gives the date when belts were matched. Belts which have been in storage over a year and "tag ends" are returned to BFG for replacement to make sure that your distributor always has a fresh stock of double-matched belts.

Here's the tag which goes on each set of double-matched belts, giving exact date belts were matched.

How to protect against static electricity in V belt drive

Static electricity is developed on every V belt drive. If there is an explosive atmosphere under certain conditions it can trigger an explosion.

Various means are used to get rid of this static charge. The most reliable method is in the use of static conducting V belts which are grounded to both the motor and the driven unit.

But unless the motor and the driven unit are properly grounded there can be no protection regardless of the type of static conducting V belt used.

Static conductivity in a V belt is made possible by special compounds used in the cover. Because cover wear reduces the belts' ability to conduct static, drives should be inspected frequently. Any belts showing cover wear should be replaced immediately. With any set of V belts, it is good practice to replace the entire set.

When ordering BFG Multi V belts, "static conducting" belts must be specified and cost slightly more. All BFG Maxipower V belts are static conducting and heat and oil-resistant at no extra cost.

The Question Corner—

Grommet construction is exclusive in B.F.Goodrich V belts. Grommets are two extra strong cord loops, inside the belts, like twisted cables, except they are endless. Unlike ordinary belts, there are no center cords in the Grommet belt, so it is more flexible, can "give" temporarily and absorb shock loads.

Let your B.F.Goodrich distributor show you how this higher capacity, longer belt life, ability to stand hard use, can reduce your V belt costs per year and make other savings in operating and maintenance costs.

Ask a factory-trained specialist

For help in selecting V belts for any kind of service, call the man who is a specialist in V belts—your B.F.Goodrich distributor. He can help you cut costs by getting longer life from your V belt drives. *B.F.Goodrich Industrial Products Company, Dept. M-799, Akron 18, Ohio.*

B.F.Goodrich V belts

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Office of Editor
1791 Howard St.
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MILLER FREEMAN PUBLICATIONS

The Editor Reads His Mail

Address letters to The Editor, PULP & PAPER, 1791 Howard St., Chicago 26, Ill.

Chemical Recovery Developments in Russia

—Pittsburgh, Pa.

Editor: A Canadian group who visited Russia last fall published a report. The following is an abstract from it:

"Another interesting development which has been made under the direction of Professor Eliashberg is a recovery system for monovalent bases using an ion exchange method. It has been estimated that the chemical consumption in a low-yield ammonia base sulfite mill could be reduced to 30 kg. of ammonia per ton of bone-dry pulp (66#). This process is considered to be close to the pilot plant stage."

I am interested in this report and also anything you might have developed along a similar line on your recent visit to Russia. Can you help me out?

E.W. HOPPER
Consulting Engineer and Metallurgist
(Chairman TAPPI Corrosion Committee)
(see below)

Further Information From Russia

—Leningrad, USSR

Editor: We are regularly receiving your magazine PULP & PAPER INTERNATIONAL, and my colleagues and I read it with pleasure.

I haven't yet seen the issue containing the report of the Canadian group of papermakers you referred to in your letter. The method of recovering monovalent bases with the use of ion exchange resins, which is mentioned in the above report, is being experimented with, and the results will soon be published. Ammonia consumption, when using this system, amounts to 15-20 kg. per ton of air-dry pulp. As to NH_3 consumption of 30 kg. per ton of pulp (mentioned in the report of the Canadian group), it was realized by us under commercial conditions without any recovery of ammonia.

Some data concerning the cooking schedule used by us, as well as some details about the method of cooking with the recovery of a monovalent base were published in the magazine "Bumashnaya Promyshlennost", 12, 1959, pp. 2-7.

M. ELIASHBERG
Department Chief
Research Institute of the Pulp & Paper Industry

Out of the Talking Stage

—Midland, Mich.

Editor: An article entitled "The Challenge of the 1960's", printed in the March 1960 issue of PULP & PAPER INTERNATIONAL (February PULP & PAPER), mentioned that, "There is talk of developing coatings for unbleached grades of kraft with such hiding power as to produce a sheet comparable to bleached kraft".

We thought it would be of interest to know that such coatings already exist. A reprint is available. It is entitled "Progress Report on the Use of a New Low-Odor Latex as the Sole Binder for Boxboard Coatings" and summarizes our work on coatings for unbleached kraft. We would be happy to make this information available to anyone interested in these high hiding power coatings.

E. J. HEISER
Coatings Technical Service
Dow Chemical Co.

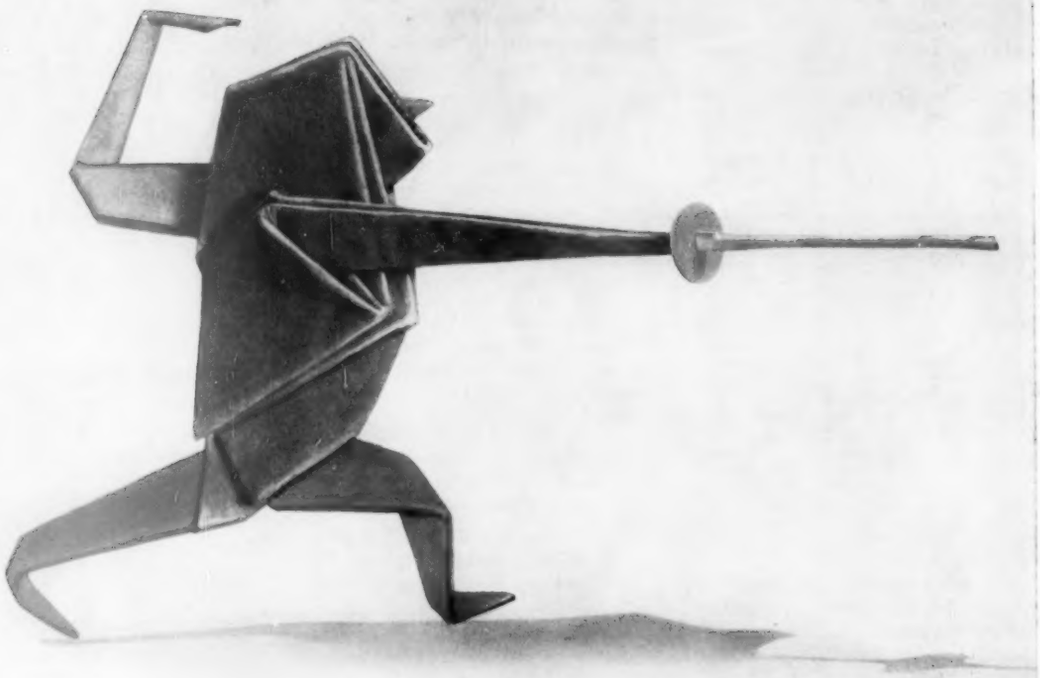
"Thorough Coverage"

—Kalamazoo, Mich.

Editor: Thank you for the thorough coverage of the Fourth Pulp & Paper Conference at Western Michigan Univ.

ALFRED H. NADELMAN
Professor and Head
Dept. of Paper Technology
Western Michigan Univ.

Paper sculpture by Giuseppe Baggi



Pulp from **Gottesman** *means...*

PERFORMANCE!

Bleached and Unbleached Sulphite • Bleached Hardwood • Groundwood
Bleached, Semi-Bleached, and Unbleached Kraft

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ORGANIZATION

WOOD PULP G

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MONTHLY REPORT – WORLD NEWS

"FAIRLY WELL ESTABLISHED" . . . is Assn. of Pulp Consumers' description of second quarter pulp prices, "although a few producers are still puzzling over the brightness tangle and where their brands may fit into the competitive picture." Says the association: "Most contracts will be offered at first quarter levels, with both wood species and brightness used as price determinants for bleached pulps."

STATURE OF A SELF-SUPPORTING INDUSTRY . . . has been reached by by-products manufactured from spent sulfite liquor solids. So says Sulphite Pulp Manufacturers' Research League, Appleton, Wis. Some 65 sulfite pulp mills in U. S. produce about 8,000 daily tons of collectible solids. Eleven are equipped to process some 1,500 tons daily, about 19% of the total.

STRIKES ANOTHER SNAG . . . "Oft-delayed plans to join United Board & Carton Corp. and Interstate Container Corp. struck another snag when a New Jersey judge ruled that it was a merger rather than an acquisition by United Board." Under New Jersey law, acquisition has to be approved merely by majority of stockholders; merger by two-thirds. (United Board is incorporated in New Jersey.)

BELIEVED WORLD'S LARGEST . . . is unwind and automatic splicer recently installed by International Paper Co. at Moss Point, Miss. Unit (supplied by Waldron-Hartig div. of Midland-Ross Corp.) feeds paper up to 152 in. in width to off-machine coating equipment. Future operation will be at 2,000 fpm, present speed 1,000 fpm. Equipment handles rolls of up to 5 ft. in dia. and weighing up to 7 tons.

PRODUCTION, STANDARDS INTEGRATED . . . at the Lock Haven, Pa. mill of New York & Pennsylvania Co. Announcement coincides with centralization of technical control, paper standards and quality control laboratory in a glass-enclosed "island" in the heart of the mill. Facility is equipped with latest quality control and paper testing instruments.

HOPSCOTCHING THE NORTH AMERICAN INDUSTRY . . . Construction has begun at the 125-ton pulp-paper mill of Menasha Wooden Ware Corp., North Bend, Ore.; production is expected in summer of 1961. . . . Stockholders have approved merger of Federal Paper Board Co. Inc., New York, N. Y., and Manchester Board & Paper Co. Inc., Richmond, Va. . . . St. Regis Paper Co. has filed registration statement relative to issuance of common stock in exchange for outstanding common shares of Howard Paper Mills Inc., with three mills and an envelope manufacturing plant in Ohio. . . . Potlatch Forests Inc., Lewiston, Idaho, has purchased 27,000 acres of timberland and a sawmill near Larendon, Ark., from Woods Lumber Co., Memphis, Tenn. . . . Fibreboard Paper Products Corp., San Francisco, has formed a new manufacturing and merchandising unit, the Tube & Can div., "to provide greater emphasis on this important packaging field."

MORE ABOUT THE INDUSTRY . . . A new 75,000-sq. ft. general administration building will be built in Port Edwards, Wis., by Nekoosa-Edwards Paper Co. Climaxing an exhaustive two-year break-in period, a new Yankee paper machine is now in full production at Crystal Tissue Co., Middletown, Ohio, turning out laminating tissue. . . . Wabash Fibre Box Co., Terre Haute, Ind., is building a $500,000 plant in Fort Wayne for manufacture of corrugated shipping containers. . . . St. Regis Paper Co. plans acquisition of Central Waxed Paper Co., Chicago converter of various flexible packaging papers. . . . A corporation has been formed in Orangeburg, S.C., that hopes to finance a $50,000,000 pulp and paper mill. . . . General Box Co., Des Plaines, Ill., will add a corrugated sheet plant at its present facilities in Meridian, Miss.

RAPID GROWTH IN CORRUGATED CONTAINER PACKAGING . . . has prompted construction of a container-pulp-paper development laboratory by Western Kraft Corp., Albany, Ore. Experimental pulping and papermaking equipment is to be installed later.

. . . Fluid Power news

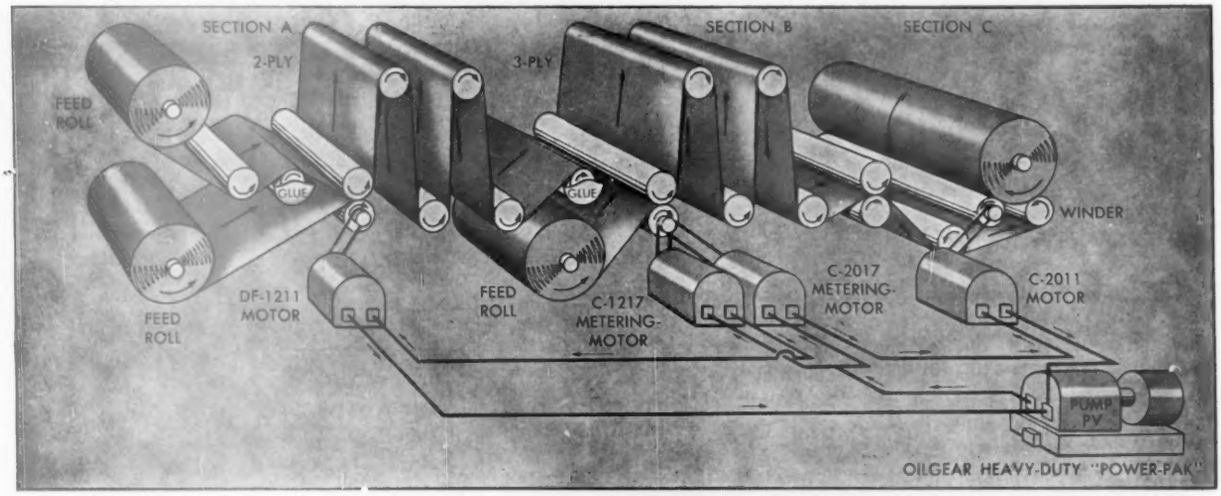
REPORT NO. 12,101
FAST-ACTING MULTI-STAGE DRIVE

From Oilgear Application-Engineering Files

HOW OILGEAR "*ANY-SPEED*" DRIVES SIMPLIFIED MODERNIZATION OF A LAMINATOR

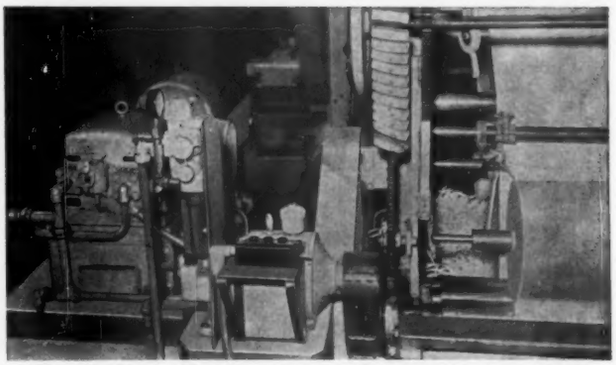
CUSTOMER: *A Large Midwestern Paper Manufacturer*

DATA: This company initiated an extensive equipment modernization program to enable expansion in competitive fields, and increase production efficiency. Part of this program consisted of adding a new section to an Oilgear-powered laminator and winder. *Requirements:* 1: Maintain proportional synchronization and power coordination between existing section and winder with new section. 2: Fast-acting controls for individual, precision, sectional speed adjustments. 3: Start, stop, change speeds rapidly, and run at *any* selected speed to maximum without tearing paper web. 4: Accurate, adjustable, automatic winder tension control. 5: Complete conversion in minimum of machine "downtime." 6: Selected drive must be thrifty on floor space and electrical power.



SOLUTION: Shown above schematically with new section A to left. Oilgear Heavy-Duty, *"Any-Speed"* drives were selected for this application primarily because of space savings, ease and speed of conversion, and long experience with Oilgear's *low-cost-per-year* operational record in their plants. Unusual application feature is the use of a single, Oilgear Size 35 "Power-Pak" as the Fluid Power source for all three exactly coordinated sections of this multi-stage machine. *Performance has proved superior to requested specifications — with no reported maintenance after more than two years of continuous, high-speed service.*

OPERATION: Oilgear type "DE" Variable Displacement Pump (PV) — accurately, remote pushbutton station controlled from zero to maximum output — drives two Oilgear type "C" fixed stroke, constant torque, radial piston motors (C-1217, C-2017). Acting as tandem motors, they power section B. They also act as meters for motors (DF-1211, C-2011) connected in series with them. Oilgear type "DF" variable stroke, constant hp, radial piston motor (DF-1211) powers new section A in series with section B motor (C-1217). Oilgear type "C" motor (C-2011) powers section C in series with section B motor (C-2017). Speed changes initiated from control station pushbuttons to Pump (PV), are imparted to section B, and proportionally to sections A and C. Proportional speed relationship between sections A and B is easily altered by stroke adjustment of motor (DF-1211). Speed relationship between sections B and C is automatically altered as roll diameter increases by an automatic winder tension valve. Maximum torque in section A is independently adjustable. Solenoid-operated brake valves insure rapid, cushioned stops. Rapid, cushioned starts are an inherent feature of Oilgear *"Any-Speed"* drives. This completely sealed, compact, fully pressure lubricated, *"Controlled-Motion System* delivers full rated torque at *"Any-Speed"* . . . automatically conserves electric power . . . quiet, vibration and trouble-free.



View from winder end of laminating machine after a "rush" conversion, completed and running without trouble ahead of schedule. Oilgear Heavy-Duty, Size 35 "Power-Pak" can be seen in left foreground. One pushbutton control station and winder tension valve are to left and in front of series driven, Oilgear type "C" motor which powers the winder section. Oilgear "C-2017" motor, one of the tandem drive metering-motors on the center section, can be seen in center background.

Because of Oilgear's long reputation for cooperative teamwork in solving drive problems with dependable, trouble-free Fluid Power Systems for virtually any application — Oilgear has become a name that all industry trusts . . . and uses.

For similar practical solutions to YOUR linear or rotary Controlled-Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

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MONTHLY REPORT – WORLD NEWS

INCREASE IN MARKET GRADE PULP CONSUMPTION . . . by U.S. paper and board mills during January is reported by Assn. of Pulp Consumers. January figure was 247,577 tons, up 12.8% from year before. Integrated mill boosted consumption 12.3%, non-integrated plants 13.2%.

BRITISH COLUMBIA SHATTERS ALL RECORDS . . . with 1959 pulp and paper production valued at $234,529,000—an increase of $43,778,000 over previous year. Since 1950 province has seen 300% advance.

LOWEST IN 23 INDUSTRY GROUPS . . . was pulp and paper's percentage-wise expenditure for research and development in 1958. Its budget for the purpose amounted to but 0.9% of sales. Highest was rubber with 9.3%. All-industry average: 3.2%.

BIG GAIN FOR LIGHTWEIGHT PAPERS . . . is forecast by George W. McCleary, director of Ecusta printing and paper specialty sales for Olin Mathieson Chemicar Corp. At recent session of National Paper Trade Assn. in New York he said demand for lightweights in 1960 and next five years "will increase faster than for any other major category of paper or paper products." He noted that sales had gone up 27% in 1959, as compared to overall 10% increase for all paper and paperboard products.

ON HEELS OF INCREASED EARNINGS . . . Abitibi Power & Paper Co. Ltd. will install fifth fine paper machine at Thorold, Ont. plant of subsidiary, Provincial Paper Ltd. Production expected late next year. Abitibi's 1959 net was $11,825,544—some $2,000,000 more than 1958 earnings.

EXPANSION IN JACKSONVILLE, FLA. . . . where United States Gypsum Co. will build multimillion-dollar mill for manufacture of chipboard papers used exclusively in firm's gypsum products. Plant will be adjacent to USG's existing gypsum-manufacturing facilities. Target date for completion: February 1961.

MORE POWER IN WORONOCO, MASS. . . . where Strathmore Paper Co. is installing $1,300,000 plant to provide electricity and steam. Facility is expected to effect savings "conservatively estimated at $100,000 annually." New turbine is rated at 3,100 kw. Steam at 625 psi and 725°F will be provided by Riley Stoker Corp. boiler.

STILL GOING UP . . . U.S. paper and board output in January was 2,890,759 tons, up 7% from year ago. Paper totaled 1,320,-269 tons (up 9%) and paperboard 1,306,-256 (up 5%).

COST-PRICE SQUEEZE IN AMERICAN INDUSTRY . . . may be broken with announcement by St. Regis Paper Co. rescinding last July's price cuts in multiwall bags and kraft paper.

EARLIER WARNING OF NEWSPRINT DEMAND SURGES . . . is now possible with new statistical system reported by Newsprint Information Committee. This, it is hoped, will avoid tight supply situations like that of 1955-56. Each month's consumption figures are fed into a computor together with some 20 adjustment factors—number of publishing days, seasonal advertising variations, fluctuattion in holiday dates, etc.

POLYETHYLENE CONTINUES PHENOMENAL GROWTH . . . says Union Carbide Plastics Co. Estimated annual production in 1959 was just over 1 billion lbs., up dramatically from the 864,728,000 of 1958.

IN SPITE OF ADVERSE CONDITIONS . . . in some areas, Minnesota & Ontario Paper Co. reported an increase of 18.2% in net earnings in 1959 on record sales volume of $87,465,744. At work during the year, says President J. B. Faegre, were "such adverse and uncontrollable influences" as (1) the high premium of the Canadian dollar; (2) increased corporate income tax rates in both Minnesota and Canada, and (3) a slow-down in homebuilding under tightening money conditions.

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CORROSION-RESISTANT
VALVES

Performance makes the world of difference

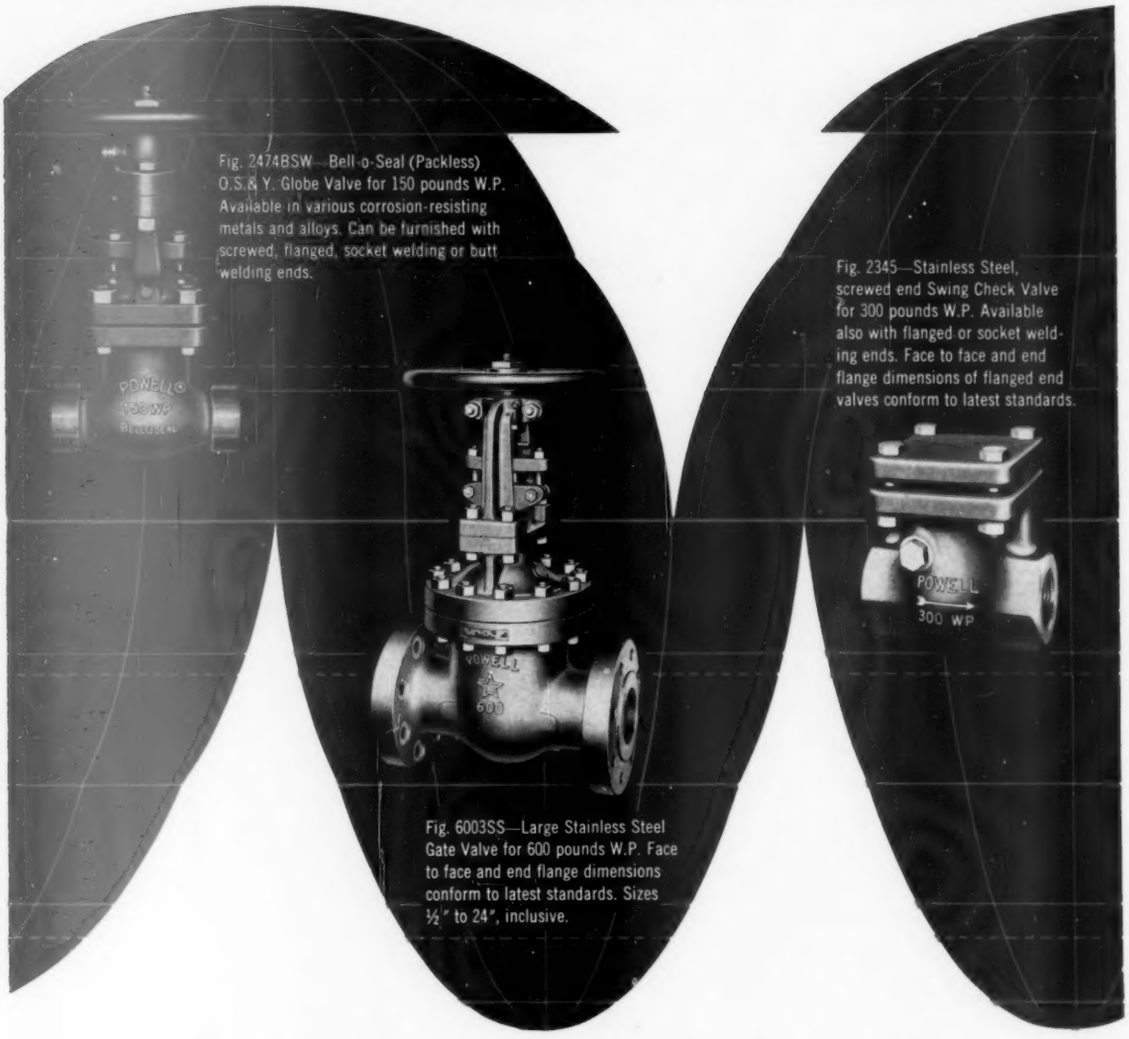

Fig. 2474BSW—Bell-o-Seal (Packless) O.S.& Y. Globe Valve for 150 pounds W.P. Available in various corrosion-resisting metals and alloys. Can be furnished with screwed, flanged, socket welding or butt welding ends.

Fig. 2345—Stainless Steel, screwed end Swing Check Valve for 300 pounds W.P. Available also with flanged or socket welding ends. Face to face and end flange dimensions of flanged end valves conform to latest standards.

Fig. 6003SS—Large Stainless Steel Gate Valve for 600 pounds W.P. Face to face and end flange dimensions conform to latest standards. Sizes ½" to 24", inclusive.

Powell pure metal and special alloy valves have long been recognized by the Chemical and Process Industries as leaders in the field of corrosion-resistant flow control equipment.

The result of painstaking research; years of experience in modern foundry practice, pattern limitations, and machining possibilities, Powell Corrosion-Resistant valves can be depended upon for long uninterrupted service, with little or no maintenance, and freedom from contamination of end product.

They are available in a wide selection of materials ranging from "A" to "Z" (Aluminum to Zirconium) to handle practically every known corrosive media. For complete details contact your nearby Powell Valve Distributor—or write directly to us.

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MONTHLY REPORT – WORLD NEWS

1960 EXPECTED NEAR RECORD IN NEW PLANT AND EQUIPMENT EXPENDITURES . . . says U.S. Dept. of Commerce of overall business picture. Such capital outlays will be about $37 billion, 14% more than last year and equal to 1957 record. In paper and allied products, new plant and equipment will cost an estimated $696,000,000—up $66,000,000 from 1959. Industry's all-time high was in 1957 ($811,000,000).

EXPORT TRADE WILL CONTINUE TO GROW . . . This is belief of U.S. pulp, paper and paperboard industry—"if freer access to foreign markets is obtained," says U.S. Dept. of Commerce. Industry's export business amounted to $337,000,000 in 1959.

STERLING AREA'S RESERVES ROSE . . . in March for second gain in row. The area (Britain and other Commonwealth nations) took in more gold and convertible currencies than it paid out in its accounts with the rest of the world. March surplus was $58,800,000, some $22,400,000 more than that of February. Reserves of sterling area on April 1 stood at equivalent of $2,780,400,000.

BRINGING CANADA CLOSER TO U.S. ECONOMICALLY . . . may be result of new trading blocs overseas. In recent interview in Vancouver, B.C., Harold S. Foley declared in favor of elimination of all tariffs between U.S. and Canada. Free flow of goods between the two countries, he says, would provide solution for Canada's economic troubles. (Mr. Foley is deputy chairman of MacMillan, Bloedel & Powell River Ltd.)

SWEDEN, FINLAND AND GERMANY . . . are among customers reported by J. M. Voith GmgH (Germany) through 1961. A Finnish mill has ordered a five-roll printing paper machine with a wire width of 8,300 mm. (327 in.)—third largest in the world and largest in Europe. . . . For Sweden, Voith is building a 7,100-mm. (280-in.) four-roll printing paper unit. . . . And for Germany, firm is constructing 6,500-mm. (256-in.) printing paper unit that will be largest of its type in country.

TREND TO CLUPAK EXTENSIBLE PAPER . . . is predicted by G. E. Amerman, president of Clupak Inc. By 1965, he forecasts, 75% or more of all multiwall bags will be Clupak.

EVAPORATION OF BLACK LIQUOR IN INDIA . . . . . at Sirpur Paper Mills, Sirpur-Kaghaznar, where a Rosenblad plant has been installed. It handles black liquor from existing bamboo sulfate digesters with pulp capacity of 100 tons per 24 hr. Evaporator was furnished by Pulp & Paper Machinery dept. of Elof Hansson, Goteborg, Sweden.

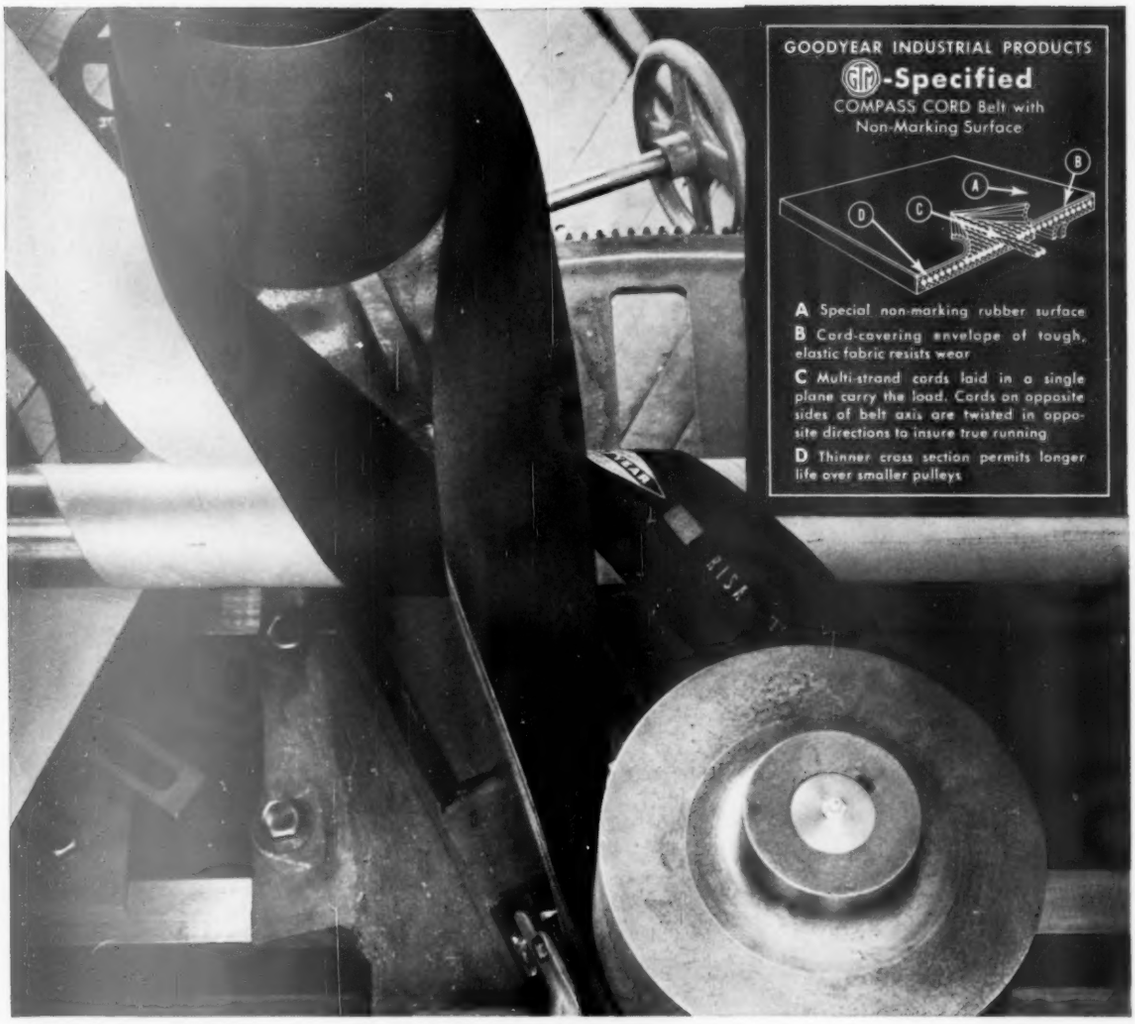
SWEDISH PRODUCTION UP . . . says Swedish-International Press Bureau. 1959 pulp output was up 5% over 1958, paper was up 11%.

UNITED KINGDOM AND THE UNITED STATES . . . together purchase approximately 55% of paper-grade chemical pulp sold throughout the world. Says the Assn. of Pulp Consumers: "Both countries are swinging rapidly away from unbleached sulfite, even in year of strong growth in total chemical pulp consumption. Bleached sulfite is also losing favor with papermakers . . ."

NEW STRAW PULP MILL IN MEXICO . . . is in operation at Monterrey, where Enpaques de Carton Titan SA is producing 60 metric tons per day. Pandia continuous pulp unit was built by Black-Clawson Co. (supplied by Parsons & Whittemore Inc.), consists of two 42-in. digester tubes.

A MILESTONE IN DEVELOPMENT . . . of New Zealand Forest Products Ltd. came about with start-up of No. 2 machine at Penrose. The Walmsleys (Bury) Group Yankee unit turns out MG wrapping paper.

MILL RUMORED FOR HONDURAS . . . Mission from legislative assembly was recently in U.S. to complete plans for survey for a pulp and paper mill to meet needs of Central American nations. Plant—to be located in northern part of Dept. of Olancho—will represent investment of at least $40,000,000.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A
B
C
D
A Special non-marking rubber surface
B Cord-covering envelope of tough, elastic fabric resists wear
C Multi-strand cords laid in a single plane carry the load. Cords on opposite sides of belt axis are twisted in opposite directions to insure true running
D Thinner cross section permits longer life over smaller pulleys

Keeps tube-winder wound up 3 times as long!

Any tube-winder drive is tough. Speed is high. Abrasion is surprisingly severe. The belt must flex continually over small diameters—must negotiate a twisting quarter-turn. So it isn't surprising that previous belts used by this upper New York State machinery maker quickly failed—required replacement all too soon.

But tough drives are routine assignments to the G.T.M.—Goodyear Technical Man. He knew he could better their belt life with rubber-covered COMPASS Cord Belts. They're sinewed with super-tough load-carrying cords for maximum resistance to stretch and abrasion—have the thin cross section which facilitates small-pulley operation. *Result: The G.T.M.'s belts are outlasting their predecessors 2- and 3-1—often better than that.*

What about your belting problems? The first step toward a moneysaving solution is a call to the G.T.M. Contact him through your Goodyear Distributor—or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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WORLD PULP & PAPER Technical News

One-Step Analysis—Germany

HUBER O., and MOERLER, W. Svensk Papperstidn. 62, no. 21: 785-9 (Nov. 15, 1959) [Ger.] Abstr. Bull. I. P. C. 30:938.

Quantitative chemical analysis of sulfite cooking liquors, which hitherto required three steps, can now be carried out in one step rapidly and at moderate cost by means of high-frequency titration. Principles and details of the method are described. A special advantage is the arrangement of the electrodes, which are baked onto the outside of the measuring cell in the form of a silver coating. Hence the cooking liquor does not contact the electrodes; the readings are unaffected by polarization, adsorption, electrode poisoning and related surface changes; and no electrode maintenance is required.

Spent Liquor in Cement

SUZUKI, ISAMU, and NAGANO, SHIGEMASA. J. Japan. Tech. Assoc. Pulp Paper Ind. 13, no. 10: 716-21 (Oct. 1959). [Jap.] Abstr. Bull. I. P. C. 30:933-4.

On stepwise addition of calcium hydroxide to spent sulfite liquor, nearly 80% of the sugars remained in solution. Decomposition of the precipitate with hydrochloric acid yielded mainly an aqueous solution of soluble lignosulfonate and calcium chloride (accounting for 30% of the solution solids). When this solution was spray dried, the calcium chloride in it dissolved only slightly in ethanol, probably because it was coated with the alcohol-insoluble lignosulfonate. The spray-dried material was found to have promising properties as a dispersing agent for cement.

Determining Burst Strength

BRYNHILDSEN, HANS OLAV, and DAGEL, YNGVE. Verpackungs-Rundschau 10, no. 8: Suppl. 57-61 (Aug. 1959). [Ger.] Abstr. Bull. I. P. C. 30:937.

The reproducibility of burst-strength determinations on seven corrugated board qualities was studied in five laboratories, using five Mullen testers. Measurements were made on randomly-distributed samples according to Swed. standard EPN-1-55. The reproducibility of a given instrument was 5-9%, whereas that between different instruments was 19-36% (with a 95% confidence limit). Increasing the number of multiple determinations did not essentially improve this result; on the contrary, number of samples could be reduced from 20 to 10 without a significant decrease in accuracy. Causes of deviations are discussed, especially the influence of clamping pressure. Corrugated boards are more susceptible to this factor than are papers and solid boards and hence yield results of relative lower reproducibility. The need for standardization of Mullen test conditions and interlab. calibration of Mullen testers is emphasized.

Presented with permission of The Institute of Paper Chemistry, under supervision of Curtis L. Brown, editor of IPC Bulletin. Photostats or translations of original reports available at reasonable cost by writing Eugene Bunker, librarian, Institute of Paper Chemistry, PO Box 498, Appleton, Wis., U.S.A.

Stock Chest's Dual Purpose

HALLAN, ROY. Norsk Skogind, 13, no. 11: 404-10 (Nov. 1959). [Norw.] Abstr. Bull. I. P. C. 30:925.

Stock chests in pulp and paper mills serve a dual purpose. Their storage capacity permits the preceding and following parts of the mill to be run independently for a short period, and their mixing action achieves a more uniform quality in the stock discharged where the quality of the pulp fed into the chest varies with time. A mathematical treatment of the mixing and quality-equalizing effect of stock chests is presented, based on the assumptions that mixing occurs immediately and completely and that the quality of the mixture is the weighted arithmetic mean of the qualities of the component batches. Considering the size of the chest and the rate of flow as constants, a differential equation for the quality of the discharged stock is set up and solved for the case where the quality of the feed changes suddenly and, after a certain period, changes back to the first value. This occurs frequently in a mill where part of the process (cooking, beating, etc.) is operated batchwise and hence may result in an over- or under-cooked or in a too lightly or too heavily beaten batch of pulp. The effect of operating several chests in series is also discussed. The mathematical treatment indicates that, if the total chest capacity is greater than the expected quantity of a single cook of substandard quality, two smaller chests in series will achieve a better mixing of a faulty batch with the preceding and following batches than one large chest would do. Conversely, if the total chest capacity is smaller than the expected quantity of faulty pulp, then a single chest will give better results.

Multi-Purpose Additives

HOLLAENDER, H. Allgem, Papier-Rundschau no. 23: 1166-7 (Dec. 5, 1959). [Ger.] Abstr. Bull. I. P. C. 30:931.

Use of a variety of wax sizes, pastes and emulsions, each for a specific paper product, is criticized, and the development and adoption of multi-purpose pulp and paper additives is recommended. One such product, Neokoll (a stable milky white wax emulsion which yields white highly disperse precipitates), is claimed to be suited as impregnating, waterproofing, internal and surface sizing and coating agent. General and specific quality improvements obtained with its use are said to include increased machine smoothness and calender gloss, reduced extensibility, even lay and register, absence of dusting and curling, and a homogeneous finely grained surface for printing, writing and photographic papers.

Force for Guillotine Cutter

DITTRICH, —. Papier u. Druck 8, no. 5: 65-7 (May-June 1959) [Ger.] Abstr. Bull. I. P. C. 30:577.

Components of the cutting force and factors affecting them are discussed, and conclusions reached are considered in relation to practical cutter design. Among factors influencing cutting force are those inherent in the material (fiber direction, paper grain, elasticity, etc.), which cannot be controlled, and those that can be adjusted for optimum efficiency (method and direction of cutting, sharpness of knife edge, knife angle, stack height, pressure). Cutting force vs. time curves are given for offset paper, blotting paper, veneer, rubber.

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how a punch press helps make paper

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A PAPER "SANDWICH" YIELDS NIP BEHAVIOR DATA. PHOTOS BY S. R. CHRISTENSEN

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hold
speed and production
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newsprint,
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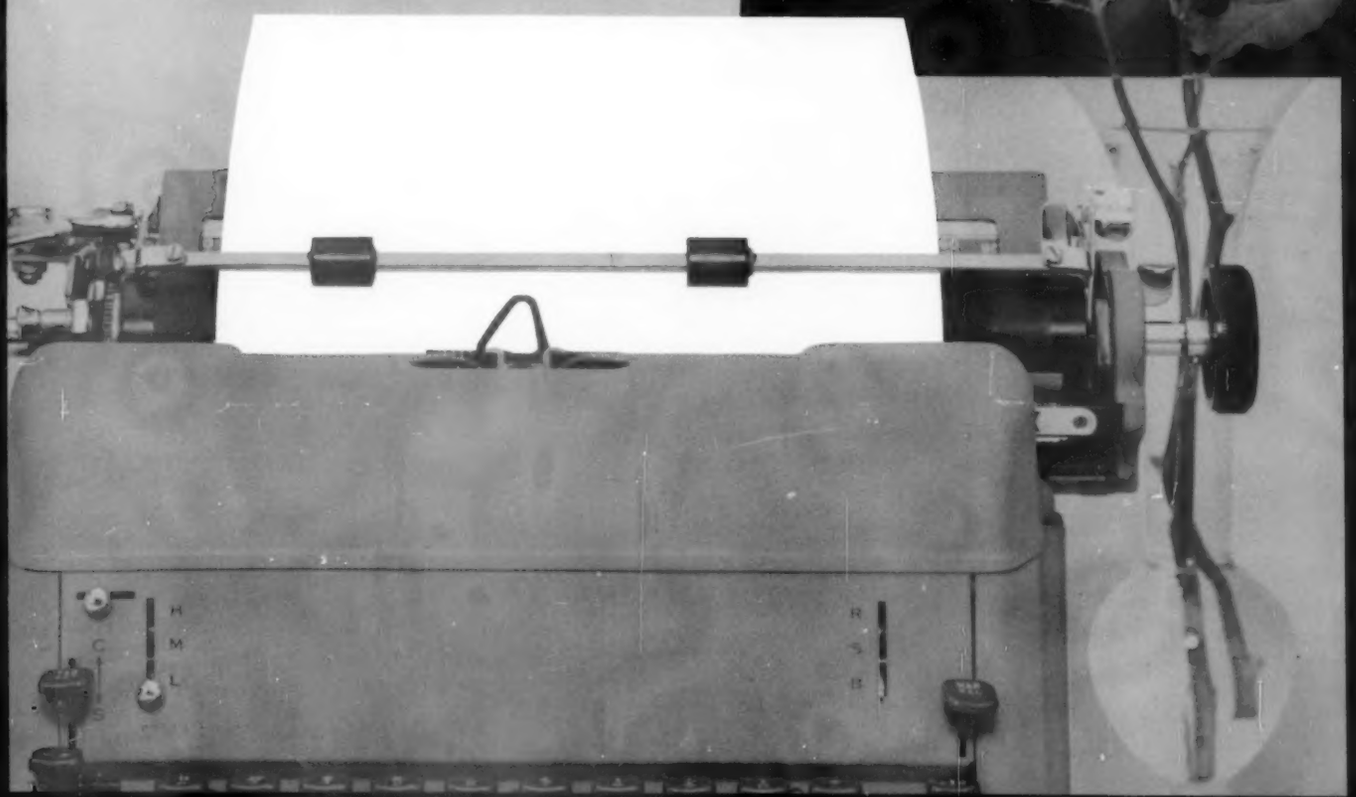

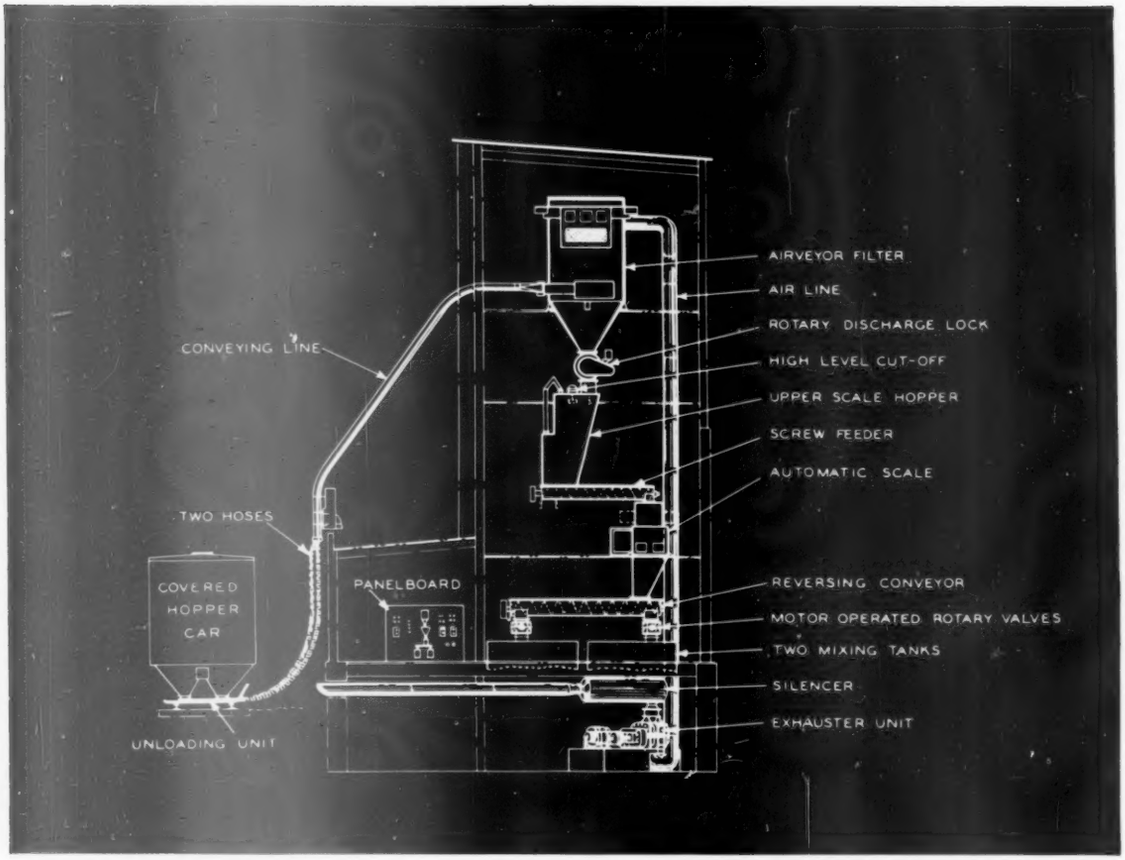

Fuller conveying system helps paper mill cut clay handling time 65%

At New York & Pennsylvania Company's Johnsonburg, Pa., paper mill a new completely automatic clay slip preparation tower speeds production. New unloading equipment has a capacity of 25 tons per hour. This is in contrast with the old manual method in which 6 men worked 5 hours to unload 30 tons of bag clay. How did New York & Penn do it? With a pneumatic conveying system designed and built by the Fuller Company.

Clay is delivered by railway car. Each car holds 50 tons of clay which drops by gravity through outlets directly into the unloading unit then into the conveying system. This consists of two 5-in. flexible hoses connecting into a main 8-in. conveying line. Clay is conveyed through a Fuller Airveyor® system to an Airveyor filter on the top floor of the building. From the filter, the clay is discharged into a surge hopper through a totally-enclosed Fuller rotary airlock. A Fuller high-level indicator on the hopper automatically opens a vacuum breaker in the conveying line in the event that clay is unloaded faster than the equipment following the hopper can take it away.

In addition to eliminating a manual operation, the enclosed Fuller system has reduced New York & Penn's clay loss and improved their dust problem. Fuller's wide variety of conveying systems and components can help solve your problems, too. Why not write us today?

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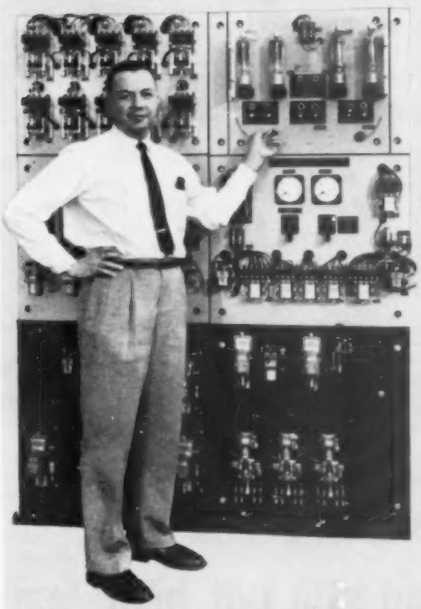
"Marathon's No. 1 Yankee tissue machine has a sectional electric drive. The No. 2 paper machine has a Reliance helper drive on the Fourdrinier, presses and size press."

Reliance VSMR electronic regulators and drives control the two paper machines in this mill. The VSMR operates on a dual-circuit 'fail-safe' principle, to assure continuity.

Paper and other industries are well aware that Reliance can give them exactly what they want in drives, motors and controls. Check your nearest Reliance Sales Engineer. He'll give you application and engineering help or, if you prefer, write us direct for information. L-1681



R. E. Farrell, Application Engineer, Paper Manufacturing, Reliance Electric & Engineering Co.

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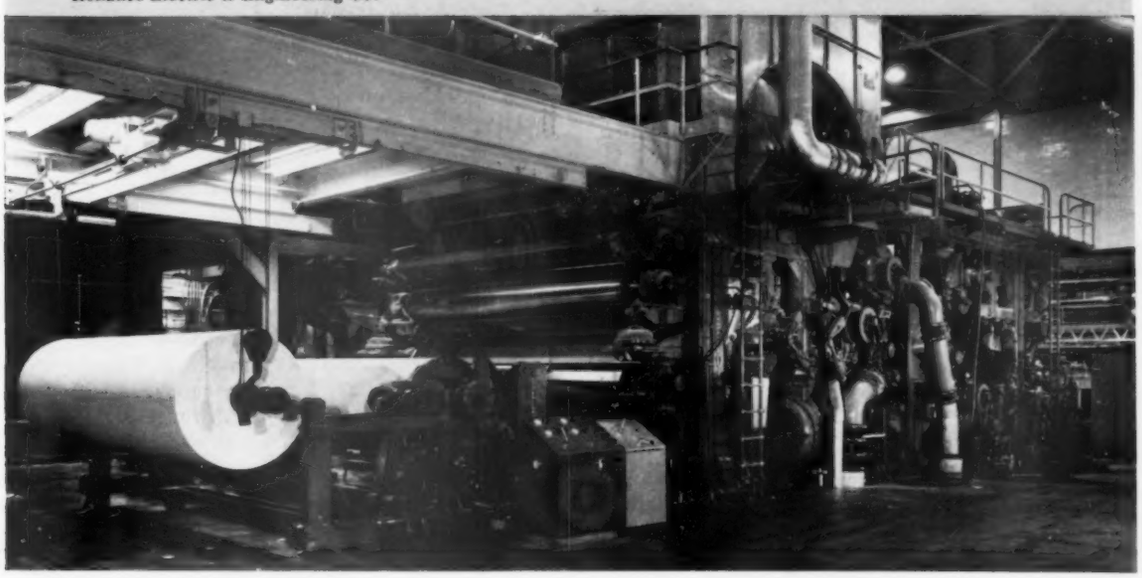
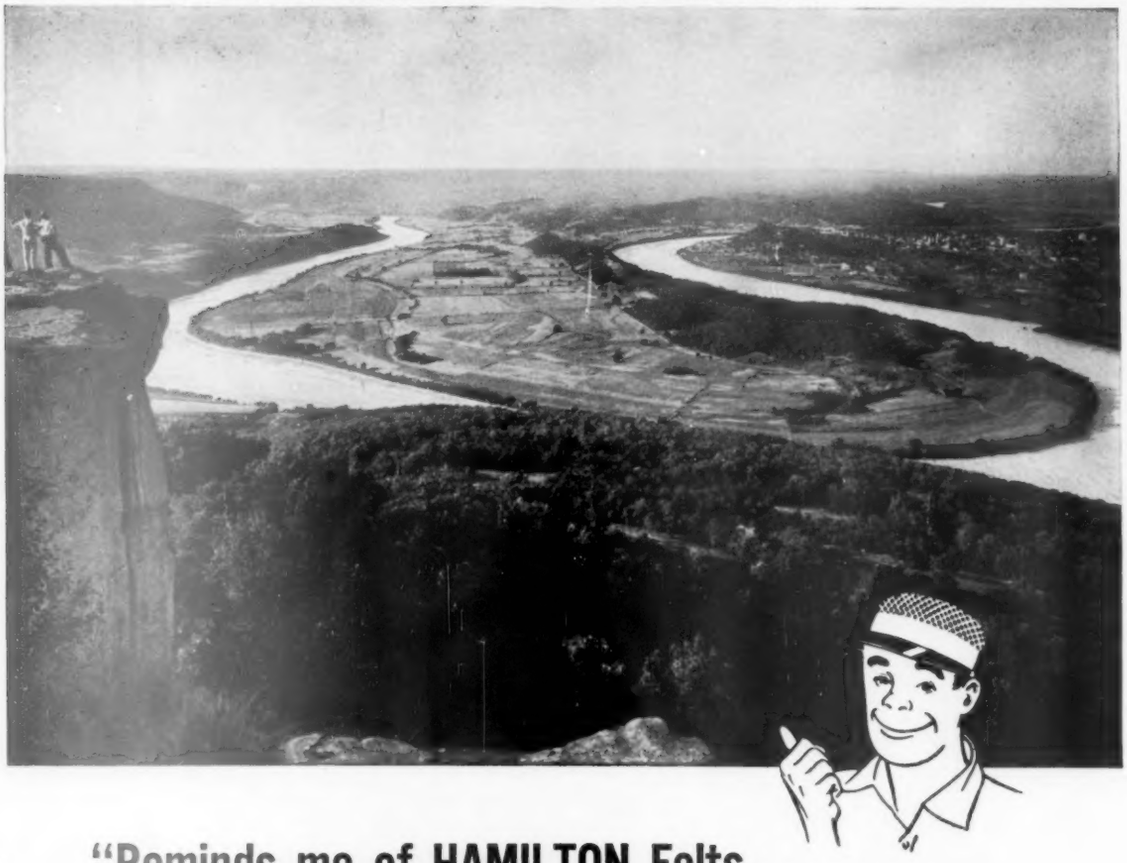


*Idea submitted by Hugh W. Gorton, Missisquoi Specialty Board Div.—Std. Packaging Corp., Sheldon Springs, Vermont

Photo by Ewing Galloway, N. Y.



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* **WIN . . . *A NEW Spincast Fishing Outfit***

"What famous landmark reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. The best letter each month by a papermaker wins a new 1960 model Shakespeare Spincast Rod and Reel — FREE! Every papermaker entrant receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today. Ham Feltz, 612 First National Bank Bldg., Cincinnati 2, Ohio."

"Lookout Mountain near Chattanooga, Tennessee
is surely well named,"
says Hugh W. Gorton.
"From it, on a clear day,
you can see seven states!

"Now, when it comes to felts
you can look far and wide, too,
but for water removal, long life
and trouble free service—
you can't beat Hamilton Felts!"

Ask your Hamilton Felt service salesman about our 300 proven styles. If one of our "standard 300" won't solve *your* needs, we will be happy to design a Hamilton Felt that will.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Which of these 3 products and services can you use from BECCO?

"Enclosing $1.00 — Send Patent License"

Well, perhaps there's a little more to your gaining use of Becco patents than just mailing your dollar in, but not much more. And certainly, no more money. The $1.00 really does cover it.

Becco has lots of patents, granted as a result of innovations in the use of Hydrogen Peroxide and other Peroxygen chemicals developed in Becco's Research Laboratories. But they don't do us a whole lot of good locked tightly in our safe. So, we long ago adopted the following policy:

If one of our patents can help you, we'll be glad to license the rights to you **perpetually,** for just one dollar. You get a nice certificate, incidentally, to cover the legalities, but more important – you also get free our complete engineering help in setting up your process, handling the material, maintenance, etc., etc.

What do **we** get? You as a **customer** – we hope – but there's no obligation on your part. Just seems to work out that way, though – when we know enough about a particular peroxygen to hold a patent on its use, chances are we've also learned enough to produce it purer than anyone else. You benefit from this; we do, too.

Use the coupon below to ask for a Sales Engineer – or our list of patents – that may help you solve an important problem.

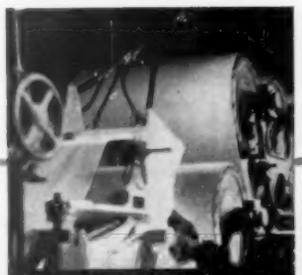
BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. PP-F

Gentlemen:
Please send your list of patents available on the use of

- ☐ Hydrogen Peroxide
- ☐ Peroxygen Chemicals
- ☐ Persulfate Chemicals
- ☐ Please have a Sales Engineer call.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____



How BRIGHT Is BRIGHT?

That's a hard question to answer. It depends on how the pulp is treated.

Trouble is, paper can show an 86 level at the layboy, but by the time the paper is delivered, this has dropped to 82 or lower. With conventional bleaching methods, that is.

Many chemical pulp producers have found the answer to this problem in Becco's Dryer Steep Bleaching Process (patented, but licensed perpetually for one buck). Applied by means of spray pipes across the pulp sheet ahead of the dryers, Becco Hydrogen Peroxide increases brightness permanence and bleaches in transit. Often, in fact, an 86 layboy level **improves** to 88 by delivery time.

This is just one example. Becco has a vast amount of technical knowledge compiled from 31 years of experience with **all** types of pulp. If **you'd** like help with your pulp, free of any obligation, let us know with the coupon below.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. PP-C

Gentlemen:
We **would** like help with our pulp. Please have a Becco Sales Engineer call.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____

Problems in handling Hydrogen Peroxide

?

Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

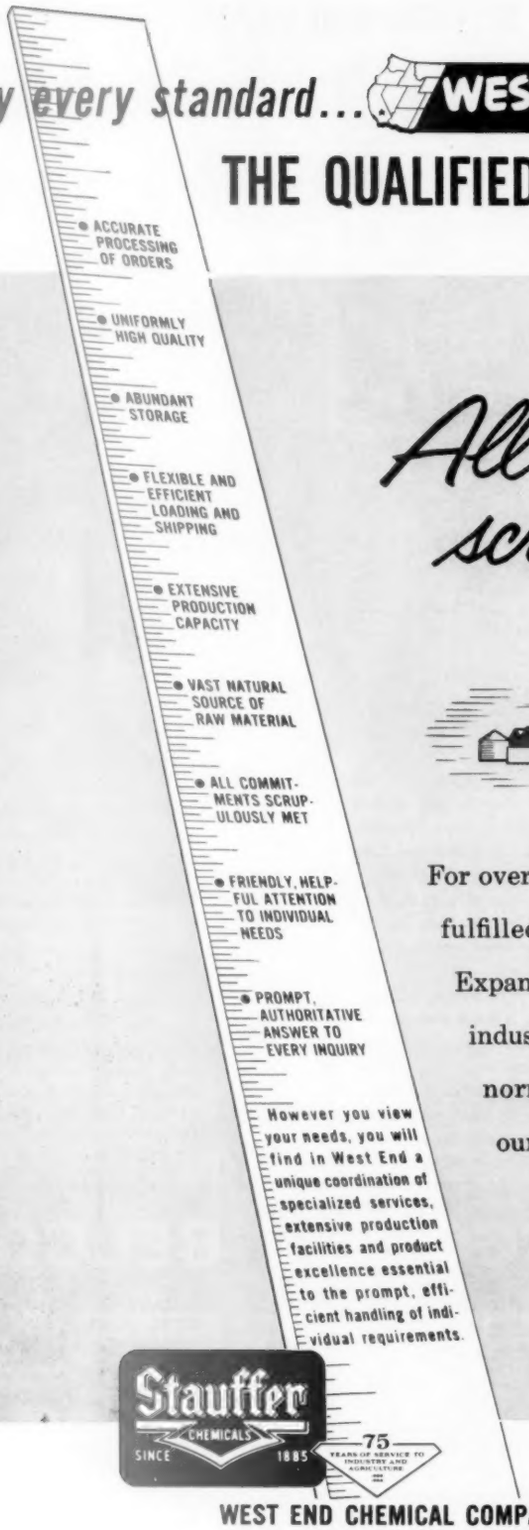
BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York
Dept. PP-B

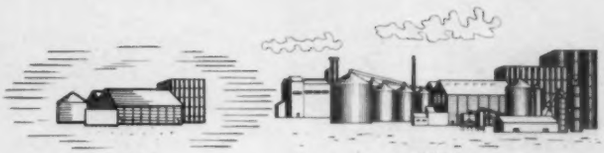
Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

NAME_____
FIRM_____
ADDRESS_____
CITY_____
ZONE____ STATE_____

By every standard... WEST END MEASURES UP AS THE QUALIFIED SUPPLIER OF SALT CAKE


ACCURATE PROCESSING OF ORDERS
UNIFORMLY HIGH QUALITY
ABUNDANT STORAGE
FLEXIBLE AND EFFICIENT LOADING AND SHIPPING
EXTENSIVE PRODUCTION CAPACITY
VAST NATURAL SOURCE OF RAW MATERIAL
ALL COMMITMENTS SCRUPULOUSLY MET
FRIENDLY, HELPFUL ATTENTION TO INDIVIDUAL NEEDS
PROMPT, AUTHORITATIVE ANSWER TO EVERY INQUIRY
However you view your needs, you will find in West End a unique coordination of specialized services, extensive production facilities and product excellence essential to the prompt, efficient handling of individual requirements.

All commitments scrupulously met



1925 1960

For over 35 years, West End has unconditionally fulfilled every commitment it has ever made. Expanding along with the chemical processing industry, West End meets the ever-increasing normal and unanticipated requirements of our customers with equal ease and dispatch.

Stauffer CHEMICALS SINCE 1885 — 75 YEARS OF SERVICE TO INDUSTRY AND AGRICULTURE

WEST END CHEMICAL COMPANY • DIVISION OF STAUFFER CHEMICAL COMPANY

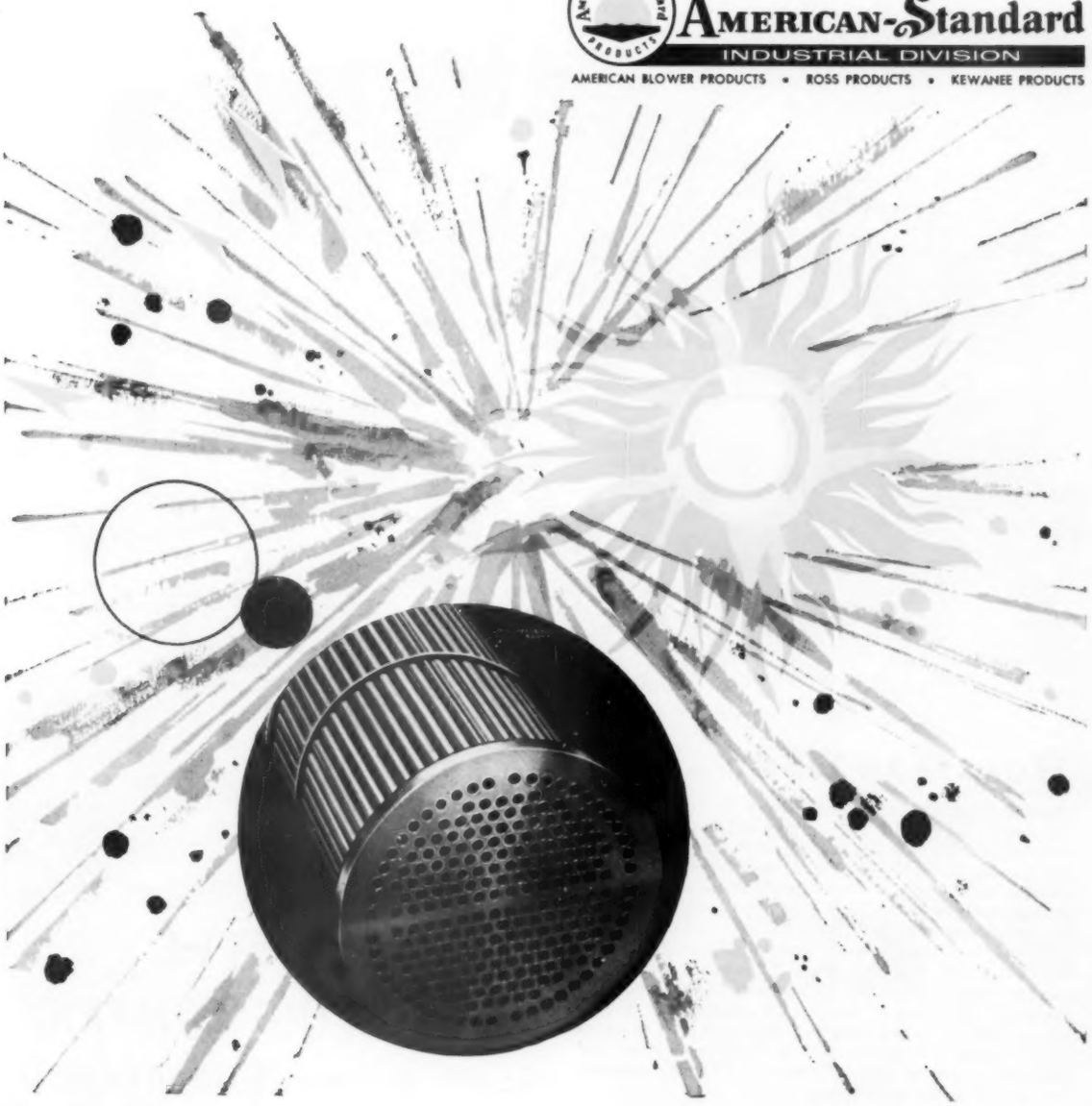
1956 WEBSTER STREET, OAKLAND 12, CALIF. • PLANT: WESTEND, CALIF.

Cracking tough heat exchanger problems is what we do best

For more than 40 years, American-Standard* Industrial Division engineers have specialized in designing and making heat exchange equipment for virtually all conditions and applications. Drawing upon this vast experience, American-Standard Industrial Division can base recommendations upon precedents of proved success. And, in many instances, our comprehensive standardization paves the way for savings in cost and time. Get the full story on American-Standard heat exchangers. Send for Bulletin 0.4A9 today. American-Standard Industrial Division, Detroit 32, Michigan.

*American-Standard and Standard ® are trademarks of American Radiator & Standard Sanitary Corporation.

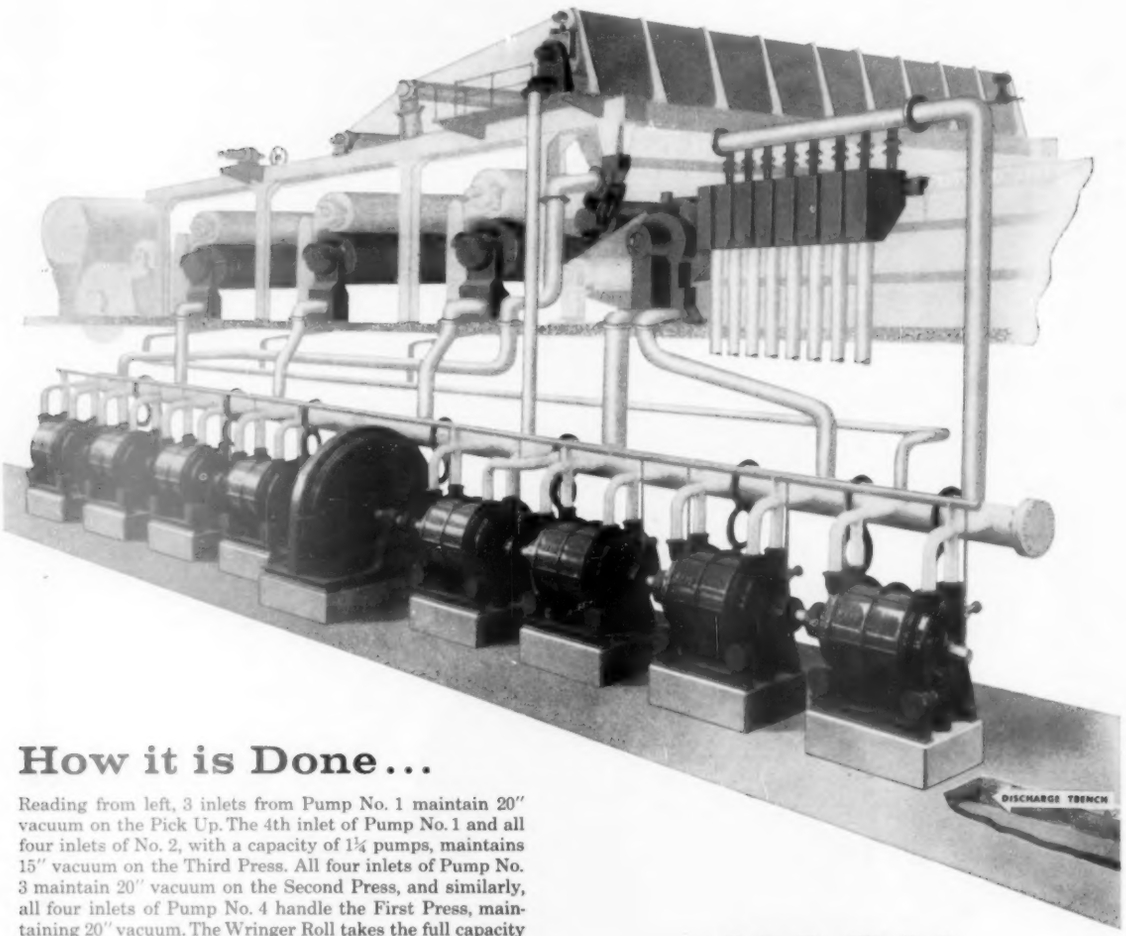
AMERICAN-Standard
INDUSTRIAL DIVISION
AMERICAN BLOWER PRODUCTS • ROSS PRODUCTS • KEWANEE PRODUCTS



NOW-

Nash Vacuum Pumps of one size, driven if desired, by a single motor, will handle all of the varied vacuum and capacity requirements of an entire Paper Machine.

Designed by Nash especially for Paper Mill service, the new 5308 vacuum pump has four separate suction inlets, each of which functions independently of the others. This offers the machine operator great flexibility, since these may be used in any desired combination to produce the variety of capacities and vacuums required by the various functions of a paper machine. These may be varied at will. Great simplicity of operation, and economy of maintenance results. The enclosed discharge trench makes possible a comparatively silent installation and permits easy and economical water recovery.

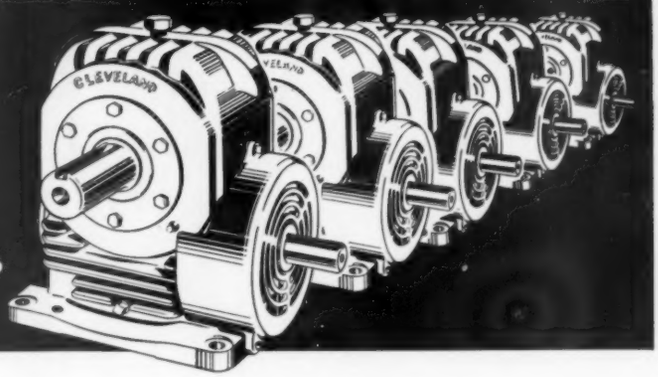


How it is Done...

Reading from left, 3 inlets from Pump No. 1 maintain 20" vacuum on the Pick Up. The 4th inlet of Pump No. 1 and all four inlets of No. 2, with a capacity of 1¼ pumps, maintains 15" vacuum on the Third Press. All four inlets of Pump No. 3 maintain 20" vacuum on the Second Press, and similarly, all four inlets of Pump No. 4 handle the First Press, maintaining 20" vacuum. The Wringer Roll takes the full capacity of Pump No. 5, requiring 10" vacuum. The High Vacuum Couch Box takes a pump and a half, 4 inlets of Pump No. 6, and two inlets of Pump No. 7, maintaining 20" vacuum. The remaining two inlets of Pump No. 7 maintain 10" vacuum on the Low Vacuum Couch Box. Only one inlet of Pump No. 8 is required to handle the Felt Conditioners at 10" and the remaining three inlets of Pump No. 8 handily maintain 10" vacuum on the Wire Boxes.

NASH
ENGINEERING COMPANY
South Norwalk, Connecticut

Why do these new Clevelands carry higher horsepower ratings?



It's because Cleveland design engineers — drawing on 47 years of experience — have successfully blended the *just right* combination of housing design, exclusive heat-treatment for alloy steel worms, centrifugal casting of bronze gear rims together with larger, more rugged taper roller bearings on worm and gear shafts.

This permits substantially higher horsepower ratings with smaller worm and gear units — units that more than meet AGMA's new Standard 440.03. Cleveland now offers speed reducers — from one to forty horsepower — at savings of 50% or more on cost per horsepower.

HOUSING is a rugged one-piece design of highest quality cast iron, ribbed for maximum strength and heat dissipation. Cooling fan of unique design is mounted on *input* end of worm shaft and is equally efficient in either direction of rotation. Only one gear shaft bearing plate is large enough to permit assembly of the gear. On gear shaft extension side, gear shaft bearing is mounted in the housing bore and backed up by a clamping plate. This gives a stronger housing and provides maximum strength for overhung loads. Housings are designed for mounting in one position only, thus avoiding design compromises necessary with *universal mount* types.

BEARINGS on both worm and gear shafts are Timken taper roller-type, providing adequate thrust and radial capacity. Worm bearings are mounted directly in housing bore for greater rigidity.

WORMS are cut integral with shaft and accurately ground to a high surface finish on both thread flanks. Shaft extension diameter is especially large to permit increased overhung load capacity. An exclusive heat-treating technique provides a high degree of hardness throughout the entire thread thickness and well below the worm's root diameter. It gives maximum thread strength and resistance to wear without losing the advantage of a tough core of medium hardness.

GEARS have centrifugally cast bronze rims with a high tin-nickel content. They provide greater density and a higher hardness, giving increased resistance to wear and fatigue pitting. Bronze rims are centrifugally cast integral with cast iron centers, in smaller sizes up to 6 inches, which permits strong mechanical keying of the two parts — without dependence on actual surface bond. Gear shaft extension diameters are especially large to permit greatly increased overhung load capacity.

ORIGINAL MASTER WORMS for each size and ratio of worm gearing, are made individually in Cleveland's tool room to extremely close tolerances and kept in perpetual stock. Cleveland makes all their hobs. No outside source has been found that can produce worm gear hobs to their exacting tolerances and standards. Each hob is checked against this master worm — as are production worms and gears. Thus, it's not necessary to ever replace Cleveland worms and gears in sets. A new gear will operate perfectly with an old worm and vice versa.

Call your Cleveland Representative today, to get all the facts on these new, more powerful speed reducers. Or, write for a copy of new, free Bulletin No. 405 giving complete engineering information.

CLEVELAND
Worm Gear
Speed Reducers

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3268 East 80th Street • Cleveland 4, Ohio

Yes, when you think about it, bright white space is what
EDGAR PAPER CLAYS are—and shipped to you
in the most convenient form—bag, bulk or slurry—rail or truck.

Step #1 in the preparation of this "bright white space" is selective mining of prime kaolin clay . . . Step #2 is water washing and fractionation with controlled viscosity and particle size to each papermaker's specification . . . Step #3—drying and large volume storage for prompt deliveries.

And—over 1,000 control tests per day to assure you highest quality Edgar clays.

Help yourself to "bright white space" in your papers.
Call M&C for ample samples, complete technical service.

EDGAR PAPER CLAYS

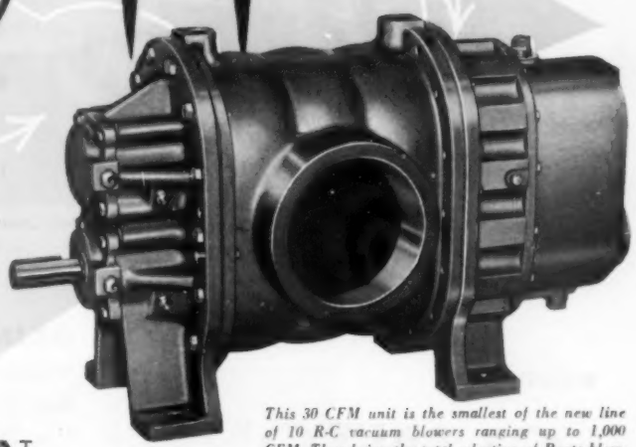
Edgar M&C *from*

Minerals & Chemicals Corporation of America

5002 ESSEX TURNPIKE, MENLO PARK, N. J.

NOW

for efficient vacuum service as low as 30 CFM...



This 30 CFM unit is the smallest of the new line of 10 R-C vacuum blowers ranging up to 1,000 CFM. They bring the total selection of Roots blowers to 46 sizes...with savings for you in every size.

A BIG SELECTION OF SMALL ROOTS VACUUM BLOWERS

Roots-Connersville adds 10 small-volume vacuum pumps to its already extensive line to give you better selection, better performance in limited-volume applications. This new line is designed to handle capacities ranging from 30 CFM to 1,000 CFM, for operation at up to 20 inches mercury vacuum in single stage construction. These units are designed for compounding for higher vacuum service.

Major features of the larger Roots water-sealed units are retained: simple, efficient design without internal valves, no internal contact between moving parts, normal maintenance limited to oil changes, efficient operating speeds and minimum sealing water requirements. The result is more CFM per dollar.

Only Roots-Connersville offers exclusive rotary positive design and such ease of installation in vacuum blowers of this size. They are now available for a wide variety of application in the food, chemical, petroleum, paper, sewage and industrial waste treatment, mining and other industries.

Your nearest Roots-Connersville sales engineer has full details on this new series of vacuum blowers. Or write for a specification sheet and for Bulletin VP-158 covering the larger units.

ROOTS-CONNERSVILLE BLOWER
DIVISION OF DRESSER INDUSTRIES, INC.
560 Willow Ave., Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto

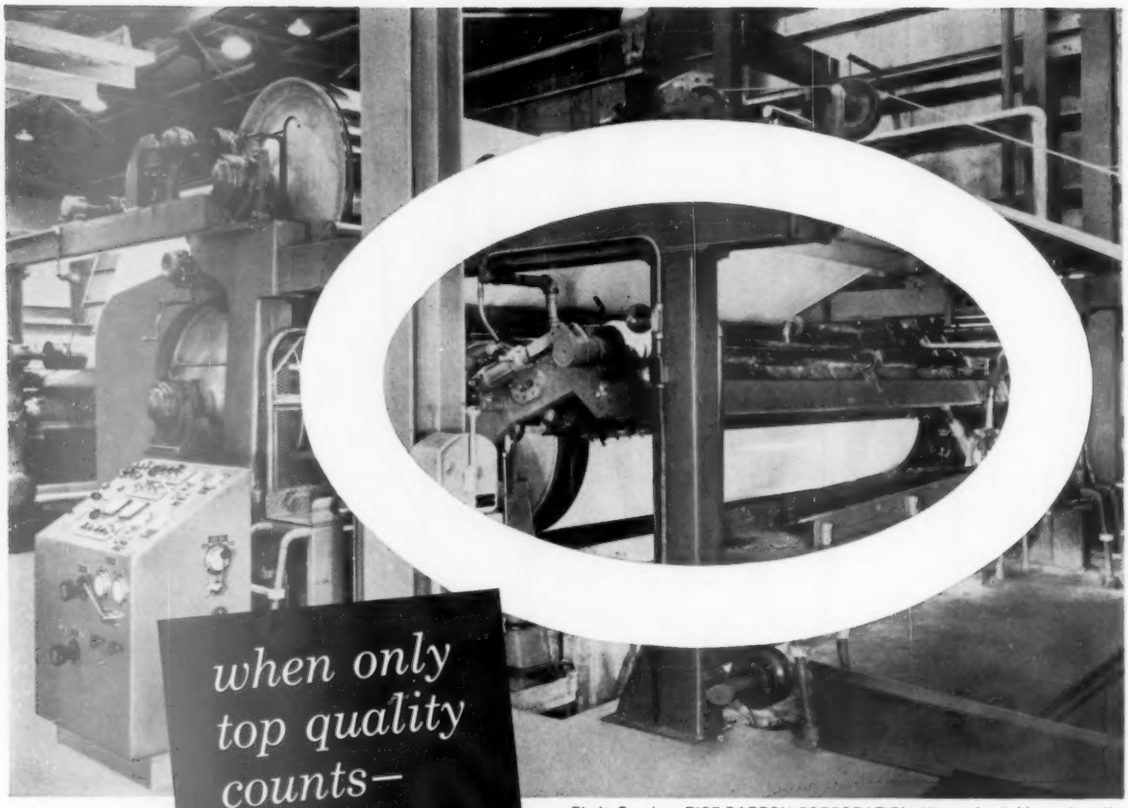


Photo Courtesy RICE BARTON CORPORATION, Worcester 1, Massachusetts

count on

CLINTON CORN STARCHES

for TRAILING BLADE COATING

CLINCO OXIDIZED STARCHES

Today's high-speed coating techniques call for color formulations with high solids and high viscosities. To meet these needs, CLINTON recommends CLINCO Oxidized Starches which offer a marked increase in ink "holdout", greater uniformity of coating on the sheet and better acceptance of the coated surface for printing inks. The next time you make a formulation for use in the trailing blade coater, find out what CLINCO 330-B, CLINCO 314-B, and CLINCO 55 can do for *you!*

TECHNICAL SERVICE
on specific problems is yours on request.
We'd like to be of service. Just write.

CLINTON

CLINTON CORN PROCESSING COMPANY, CLINTON, IOWA

Bauerite PAYS OFF

Four mills* of the many using the Bauerite® process to make groundwood type pulp from chips are **doubling** their production. Wood economics often force mill owners to look for a substitute for their dwindling supply of softwoods.

Production advantages, new economies and greater profits are available with the Bauerite process. For instance, many have gained a constancy of quality superior to that possible with conventional groundwood. Slabs, edgings, certain sawdusts and chips of irregular size—in various blends and often from species of wood previously not suitable—are being used from local sources. These are some of the reasons why mills find this process profitable. Write, or ask your Bauer representative for complete information.

**Gould Paper Co., Lyons Falls, N. Y.; Daishowa Paper Manufacturing Co.; Jujo Paper Manufacturing Co. Ltd.; Tokohu Pulp Co. Ltd., Japan.*

The Bauer Bros. Co.
1706 Sheridan Ave., Springfield, Ohio

This Bauer double revolving disc refiner is bound for Gould Paper Co., Lyons Falls, N. Y., where production of Bauerite groundwood pulp from chips will soon be doubled.

Photo courtesy Patent Scaffolding Co.

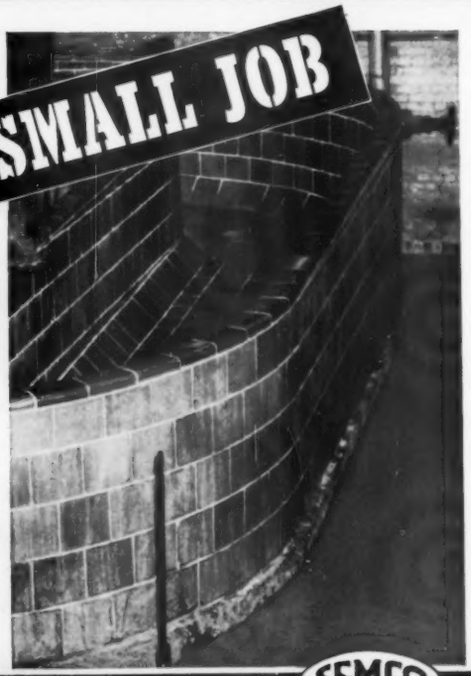
Complete Service

Design, Installation and Maintenance of

LININGS and TILE TANKS

Any job—from the very largest to the smallest—can be installed by Stebbins under a simple contract which covers everything from the original design, which is based on a full knowledge of the chemical, physical and mechanical requirements, to the finished job ready for use. Maintenance can also be included. As proved by the experience of leading mills throughout the country, you can rely completely on Stebbins service.

See Chemical Engineering Catalog or Write for Information



SINCE 1884
Specialists in Design Installation and Servicing of Linings and Tile Tanks

SEMCO

STEBBINS Engineering and Manufacturing Company

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STEBBINS ENGINEERING CORP. — TOWER BLDG., SEATTLE, WASH.

CANADIAN STEBBINS ENGR. & MFG. CO., LTD. — TOWN OF MOUNT ROYAL, MONTREAL 9, CANADA

US RUBBER

FLEXLITE ALL-DACRON FIRE HOSE

Dragged over brushed concrete for 8 miles—

U. S. Flexlite All-Dacron Fire Hose did not fail

(Cotton Hose wore out after 2 miles!)

This test convincingly proves the overwhelming ruggedness of Flexlite® Hose. It demonstrates, too, that a hose can be rugged and at the same time light and *flexible*. Flexlite's lightness enables fire crews to fight fire without being hampered by excess weight.

U.S. Flexlite Hose brings you these other advantages: It won't absorb water and hence can't freeze. It is highly resistant to oils and chemicals. Every foot is subjected to five hundred pounds test pressure before leaving the factory.

This hose comes in any color for ready identification as a fire hose. This prevents its being carried off or utilized for purposes other than fire fighting.

• • •

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

US RUBBER

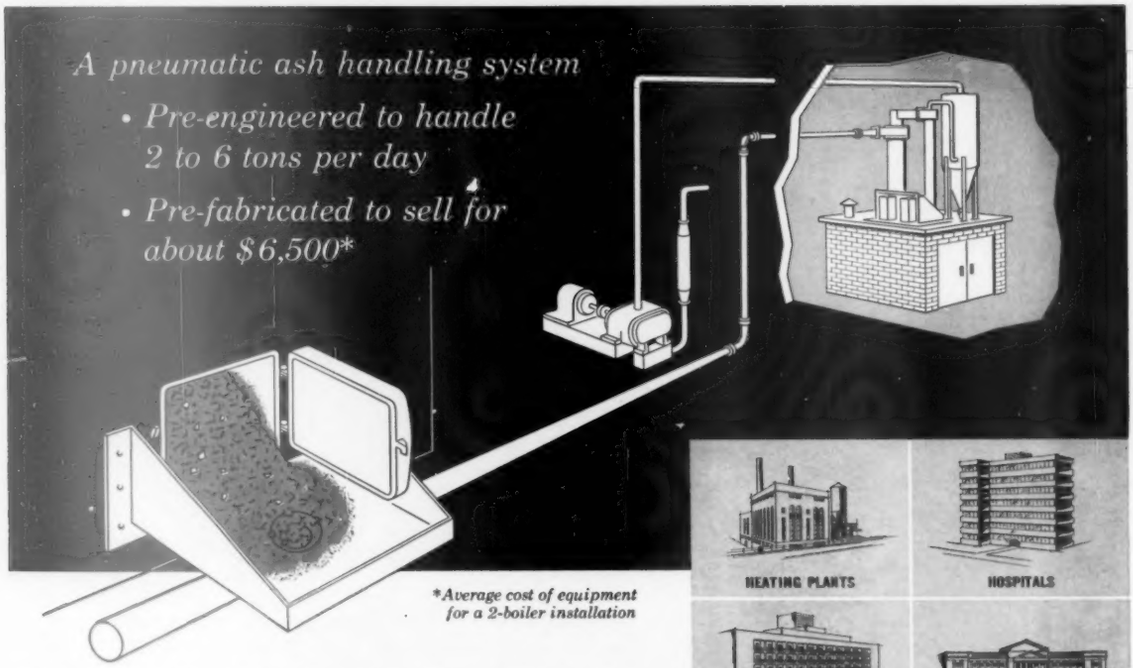
Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

THE FIRST BIG BREAK IN ASH HANDLING COSTS
FOR THE SMALL COAL BURNING PLANT



*Average cost of equipment for a 2-boiler installation

Engineers of small coal burning plants—Heating Plants, Hospitals, Hotels, Institutional Buildings, Military Installations, Municipal Power Plants, Office Buildings, Schools, Colleges, Small Industrial Plants—have long wished for a small, practical ash handling system that would eliminate much of the inconvenience, dust and constantly increasing labor costs of manual ash removal. Available ash removal systems could not be economically justified where less than 10 tons of ash per day was produced.

Aware of this need, The Allen-Sherman-Hoff Company assigned its best engineering talent to untangle the problem. The result: the *new* A-S-H ECONO-ASH System.

A major step in solving this problem was pre-engineering. Use-proved designs of major components were re-engineered to handle smaller quantities; new equipment was designed and tested. One requirement was basic: cost reduction without loss of efficiency. Installation, for example, was made so simple that it can be made with local labor.

We've prepared a 4-page brochure to explain the *new* ECONO-ASH System—how it operates, its variations and its advantages. We'll send it to you immediately upon request. It also lists the A-S-H Sales Engineers—one is near you—who will be glad to show you how, in most installations, the *Econo-Ash will pay for itself in two years or less.*

MATERIALS HANDLING SYSTEMS

ASH

the **Allen-Sherman-Hoff** company

247 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities

Everything's under control at Buckeye

UNIQUE CONTROL SYSTEM ASSURES HIGHEST QUALITY KRAFTS

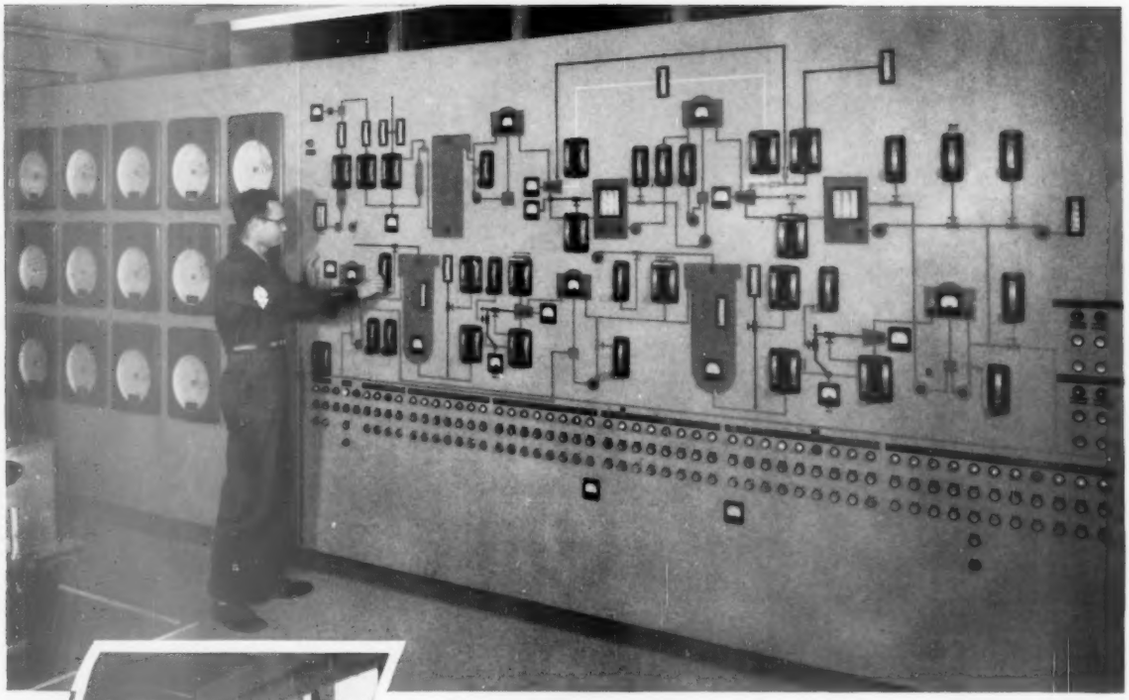
It takes more than routine sampling and standard controls to produce outstanding kraft for today's paper industry. At Buckeye, highly specialized equipment and advanced statistical methods maintain desired pulp specifications within extremely narrow limits. A pneumatic tube system shuttles samples of stock-in-process to plant laboratory for detailed analysis. Written operating instructions cover every pulp, every stage, every process condition. Nothing is left to chance.

For highest quality krafts today, tomorrow, and in the years to come, contact Buckeye . . . the market pulp producer with everything under control.

BUCKEYE CELLULOSE CORPORATION
Memphis 8, Tennessee
Wood pulp plant at Foley, Florida
Cotton linters plant at Memphis

BUCKEYE PULP

Bleached Kraft



Photos courtesy Marathon Southern Corporation

Bailey controls Marathon's five-stage bleach plant!

Marathon Southern's five-stage bleach plant at Naheola, Ala., is one of the most completely instrumented in southern U.S.A.

Rigid quality control—automatic and foolproof—keeps production going at top speed with unvarying excellence in the finished product.

The panel board in the central control room (above) was built and instrumented by Bailey. Note how it is divided into two sections. The 15 Bailey Recorders in the recorder section provide continuous circular chart records. The functional graphic panel on its right provides a complete visual picture of the entire process. Important control variables such as stock consistency, stock flow, bleach liquor flows, stock temperatures, etc., can be watched and instantly corrected, either automatically or manually.

At the same station, the operator can supply consistency-controlled stock (from any of four storage towers) to any of the semi-bleach, pine bleach, or gum bleach pulp chests on a ratioed flow, automatically controlled basis.

Each of the five vat bleach washers is equipped with automatic level control (as shown at left).

This is but one example of how Bailey is helping pulp and paper processors to greater degrees of automation, efficiency, and quality control. Let your Bailey Engineer suggest applications to fit your operation. Or write for specific control systems information for your entire plant operation. P149-1

PULP AND PAPER DIVISION

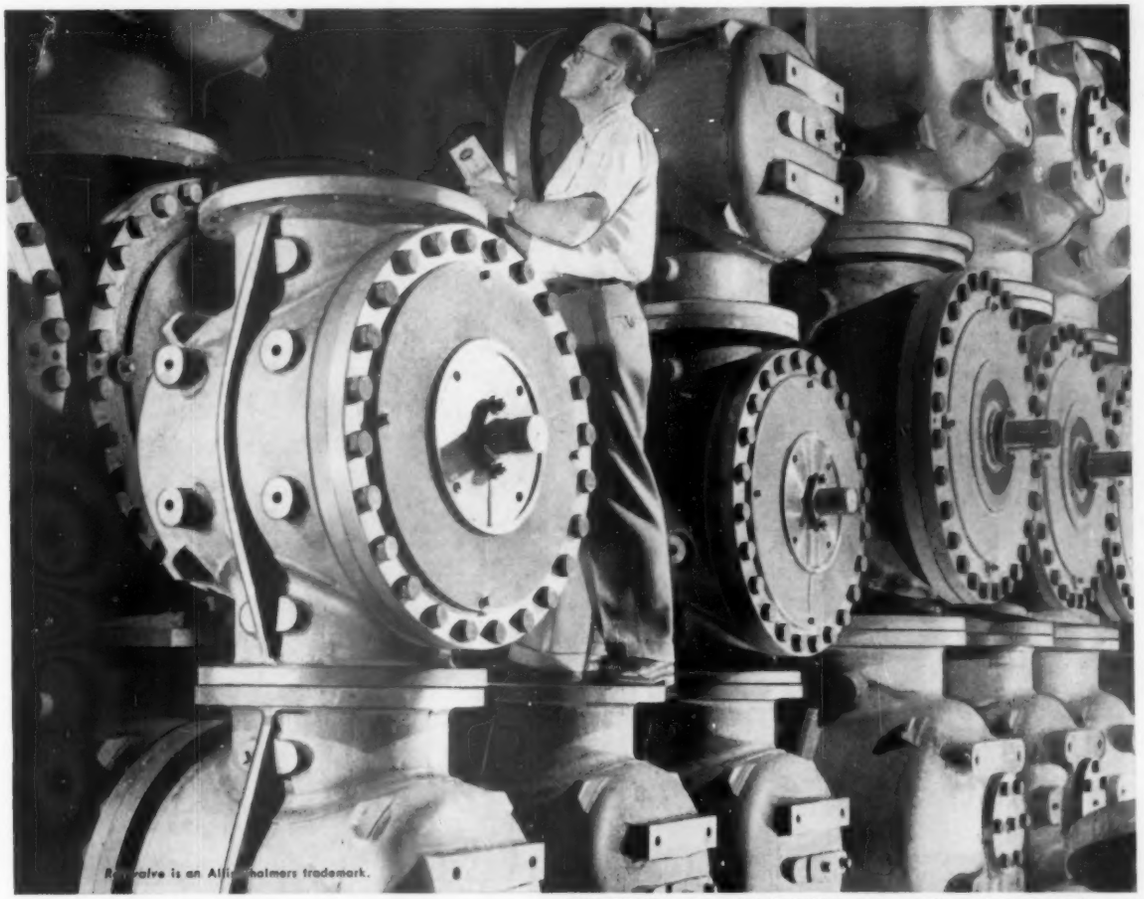
BAILEY METER COMPANY

1037 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

ALLIS-CHALMERS

A-1260



ROTOVALVE stocks at A-C York Works save months of delay for customers.

Another Allis-Chalmers time-saving exclusive:

Cone valves "right off the shelf!"

Six to thirty-inch *Rotovalve* units — awaiting your call. Think of the valuable time you save! Typical is the case of a western municipality that recently needed one 24-inch and three 20-inch *Rotovalve* units for their waterworks. Allis-Chalmers assembled all accessories required, completed testing and shipped the valves to customer in less than three weeks! Compare this with the 3 to 6 months normally required by other suppliers for delivery.

Perpetual off-the-shelf inventory of *Rotovalve* units, butterfly and ball valves gives Allis-Chalmers today's only complete rotary valve-stocking program . . . guarantees fastest deliveries to you.

Avoid troublesome, costly delays and get the valves you need to do the job right. For immediate assistance anytime, call your nearby A-C valve representative, district office or write **Allis-Chalmers,** Hydraulic Division, York, Pa.

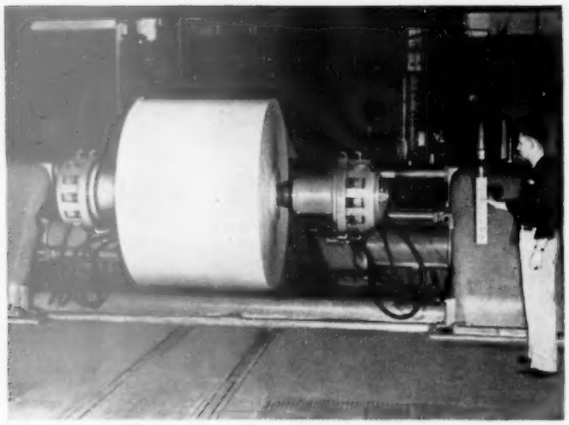
Rotovalve is an Allis-Chalmers trademark.

Standard butterfly and ball valves illustrated are also available from stock in a broad range of sizes.

Ready for the roll. Notice the absence of a shaft. Roll is moved in between lifting arms which close under pressure and elevate to desired height.

LANGSTON SHAFTLESS UNWIND STAND

Boost your production . . . reduce your slitting and rewinding costs



Easy, fast, completely safe. One man does everything. Operating push-button controls, he closes lifting arms, elevates roll, sets brakes.

One man can load the heaviest roll. No heavy shaft to handle. No cone tightening. No couplings to engage. No crane lifting. Just pushbuttons. This is the Langston heavy duty shaftless unwind stand for rewinding and converting applications.

You not only save time, you also get better unwinding. Roll can be positioned laterally by push-button control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

This new Langston shaftless unwind stand can be used with any make of slitter. Available for maximum roll widths from 40 to 132 in. and diameters from 14 to 84 in. Speeds to 3000 fpm and higher. For complete information, write Samuel M. Langston Co., Camden 4, N. J.

LANGSTON *Leadership by design*

ALLIS-CHALMERS

A-1235

ACID AREA APPLICATION. Safety equipment and clothing are a "must" for personnel in the acid atmosphere of Dow's chlorine plant at Freeport, Texas. This **Super-Seal** motor came prepared, too — with **Poxeal** insulation guarding the stator.

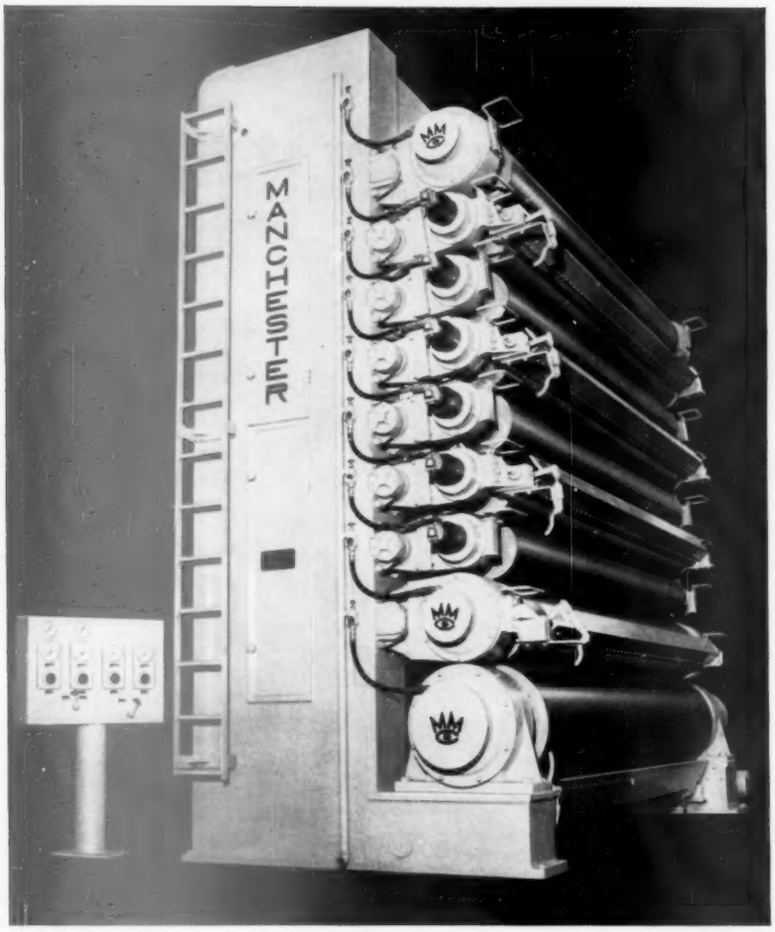
Nothing...but nothing...stops Super-Seal motors

In a tough acid pump installation, Dow Chemical's Texas Division experienced no end of motor troubles. It seemed nothing could stand up in that humid, corrosive atmosphere. Reports Dow: "Even with totally enclosed motors, winding failures were frequent." And, they might have added, expensive.

Then came Super-Seal motors— with amazing *Poxeal* insulation. A durable case of epoxy-resin encloses the winding end turns and slot portions of the stator . . . the most complete protection ever developed. Result? The *Super-Seal* motor, *after two years* of continuous operation in the acid area, is as good as ever. So good, in fact, that Dow has ordered 150 *Super-Seal* motors for a new chemical plant at Freeport, Texas.

Isn't it time to revaluate *your* motor standards? There's a good chance that *Super-Seal* motors can solve your motor problems, too. Contact your A-C representative or distributor, or write **Allis-Chalmers,** General Products Division, Milwaukee 1, Wisconsin.

Super-Seal and Poxeal are Allis-Chalmers trademarks.



Manchester gives you everything you want in a calender

New Manchester nine-roll, 147 inch face open side calender built for Champion Paper & Fibre Company, Hamilton, Ohio

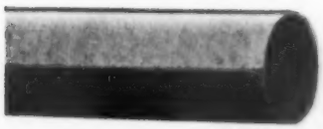
Here is a truly *new* open side calender *with independent load control of any roll in the stack.* Now you can produce a smoother, more uniform finish on a wider range of fine papers. Another outstanding feature is Manchester's air-over-hydraulic loading system. It permits precise pressure adjustments for all rolls . . . gives you all the advantages of sturdy hydraulic loading . . . *yet uses only ordinary mill air pressure as a power source.* No hydraulic pumps, tanks or motor drives needed!

All loading, unloading and *nip relieving* is accomplished through levers within the rugged, all-steel calender frames. Every adjustment is under finger-tip control from a master console.

This new calender is another example of how Manchester builds profits for paper makers through *modern*, efficient design concepts. For the new equipment you're planning now, why don't you call in the Man from Manchester? **The Manchester Machine Company, Middletown, Ohio**

Manchester . . . profit builders for paper makers

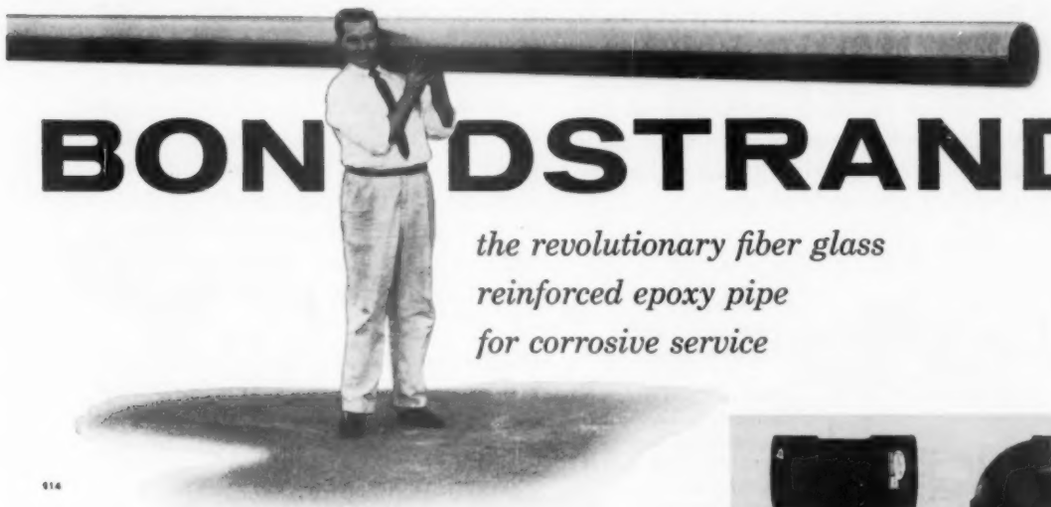
THE MANCHESTER MACHINE COMPANY



STRONG as steel pipe

... at one-eighth the weight!

Circumferential Tensile Strength ... 80,000 psi



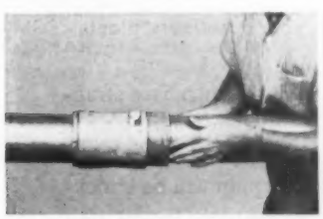
BONDSTRAND®

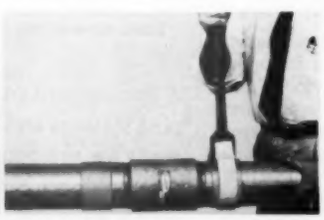
the revolutionary fiber glass reinforced epoxy pipe for corrosive service

914

Here's a pipe that holds up indefinitely under the corrosive action of many salt, acid and alkaline solutions ... that can't contaminate or flavor the piped material ... that is rigid enough to resist sag, cold flow or deformation – flexible enough to follow normal ditch contours ... that remains smooth and unclogged throughout its entire service life ... that won't leak, even near its burst pressure.

Easy to install, with choice of locking wedge or threaded fittings.





Simple instructions with each shipment insure a perfect joint on the first try.

IN THE PAPER INDUSTRY...

The resistance of BONDSTRAND pipe to chemical solutions and wet environments make it well suited to pulp and paper operations, including the transportation of pulp, stock, water, wastes and dyes. Tests are recommended for liquor applications.

Amercoat® CORPORATION

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360 Carnegie Avenue, Kenilworth, New Jersey
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6530 Supply Row, Houston, Texas

A Subsidiary of American Pipe & Construction Company

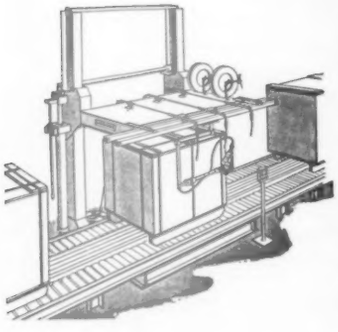
MORE FROM SIGNODE ABOUT NEW DEVELOPMENTS IN PAPER PACKAGING

Now you can get your paper to your customers in top condition at less cost to you

Two simple concepts, shown below, make it possible for paper mills to get their paper to their customers in excellent condition, yet reduce packaging costs. Back of this development lie years of work and experimentation by Signode with the patient cooperation of many leading mills.

Centralized Packaging with Jib or Bridge Crane

One of these concepts is the centralized packaging station. Signode's specialists in paper packaging are available, at no cost, to help re-arrange product flow in a practical way within existing space limitations.



Compression Strapping with CS20-1 Press

The second concept is compression strapping which offers today's ultimate results in minimizing damage to paper in transit and maximizing receiver benefits. Compression is an optional addition to your centralized strapping station.

An important ingredient in the successful application of the Signode centralized strapping and compression strapping is the Signode way, which includes cooperative consultant engineering service from Signode paper specialists. These men know some very valuable (to you) tricks of their trade. They are in addition to and work together with our regular field engineering, testing laboratory, and sales representative staffs.

Here are some of the advantages you and your customers can expect from strapping the Signode way. You'll get them even without compression, but to a greater degree *with* compression:

Packaging material savings

Reduction in paper slippage in transit

Better moisture content control

Fewer customer complaints

Receiver can triple-deck his paper

More usable sheets per skid of paper

Less downtime in your customers' plants

A documented analysis of centralized strapping stations and compression strapping is ready for presentation to you. If you don't do anything, a Signode man will be knocking on your door in due time. If you wish to get him there sooner, or want to make sure you are present at the presentation, just let us know.

First in steel strapping

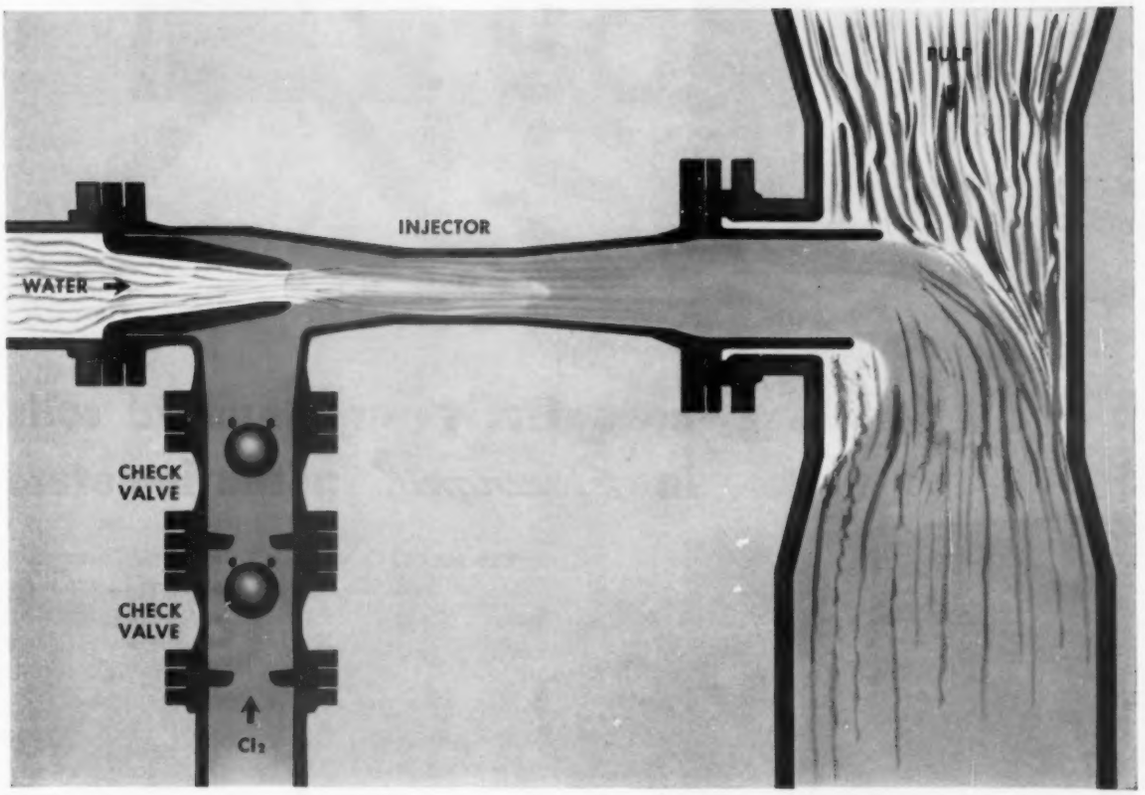
SIGNODE STEEL STRAPPING CO.

2672 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

ONE STEP TO BETTER PULP CHLORINATION

A TOUGH NEW CHLORINE INJECTOR



Engineered for Chlorine
Dependable Check Valves
Fiberglass-Polyester Body
Corrosion and Fire Resistant

Here is a rugged new injector engineered specifically for safe, efficient chlorine injection into pulp stock.

Body, nozzle, tail piece, and check valves are made from Hooker Hetron® polyester resins reinforced with fiberglass . . . materials that are tough, free from corrosion and safely fire retardant.

The long venturi is as smooth as glass, so you get maximum use of water energy to atomize the chlorine for rapid, uniform solution in pulp slurries.

Dependable double check valves protect against a water backup into the chlorine system.

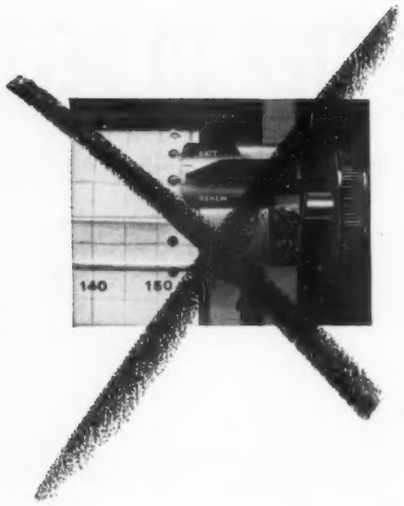
Hooker technical service engineers will be happy to help you design and install a complete system. They can also advise you on the other important steps of Hooker pipeline mixing, redox control, and retention time control.

Write for a descriptive bulletin on the new Hooker chlorine injector.

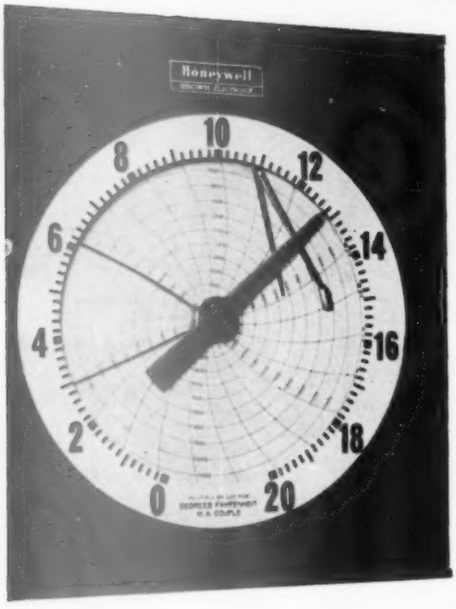
HOOKER CHEMICAL CORPORATION
1905 Forty-seventh Street, Niagara Falls, N. Y.

Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS



NOW! no batteries or standard cells in *ElectroniK* potentiometers



The new Honeywell Continuous Voltage Stabilizer makes batteries, standard cells, and standardizing mechanisms unnecessary in new Brown *ElectroniK* circular or strip chart potentiometers. This new unit accurately regulates the D-C reference voltage supply to the measuring circuit. Standardization is no longer necessary.

The small compact stabilizer unit uses Zener diodes and an ambient temperature compensator to deliver a constant rectified voltage from line supply. This enables the instrument to respond to changes in the measured variable without interruption.

Each Continuous Voltage Stabilizer means more dependability, less maintenance, continuous attention to the measured variable, and still another reason why *ElectroniK* instruments are your best value in measurement and control. Get complete details from your nearby Honeywell field engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

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75th YEAR PIONEERING THE FUTURE

Satisfying the Southeast's Sulfuric Acid Requirements for more than fifty years.

Highest quality virgin acid from Copperhill, Tennessee. 60° Be, 66° Be, 98% Sulfuric Acid and all grades of Oleum.

For more information see our inserts—
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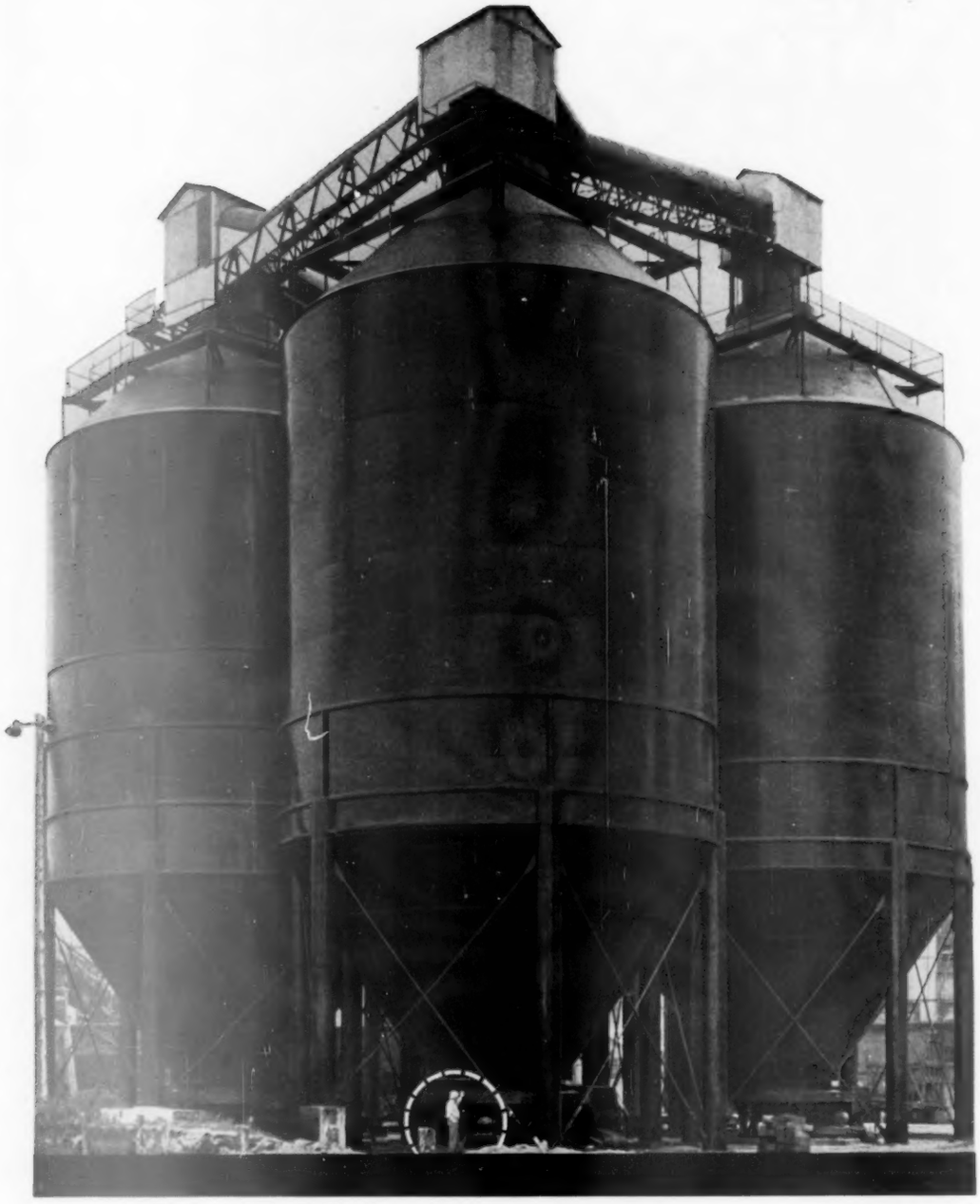

FABRICATION AND ERECTION...
Vessels by American Pipe & Construction Co.

Performance and dependability of facilities are vital in the highly competitive paper industry. That's why there's special significance in the fact that the Longview Fibre Company, one of the outstanding mills in the industry, has selected American Pipe and Construction Co. as one of its sources for steel fabricated units. ■ American's experience of 35 years serving the Northwest as designers, fabricators and erectors of quality steel plate installations is available for your needs.

Partial list for Longview Fibre Co.

- Digesters
- Blow Tanks
- Accumulators
- Hypo Towers
- Dryer Rolls
- Hydrapulper Hoppers
- Stock Chests
- Lime Storage Silos
- Oil Storage Reservoirs
- Salt Cake Silos
- Dissolving Tanks and Vent Stacks
- Recovery Boiler Stacks and Ducts
- Chip Silos
- High Density Storage Tanks
- Chlorinator Towers
- Lime Mud Storage Tanks
- Green Liquor Clarifiers
- Green Liquor Storage Tanks
- Foam Tanks
- Jet Condensers
- Filtrate Tanks
- Alum Storage Tanks
- Caustic Soda Tanks
- White Liquor Storage Tanks
- Causticizer Tanks

American PIPE AND CONSTRUCTION CO.

Northwest Division

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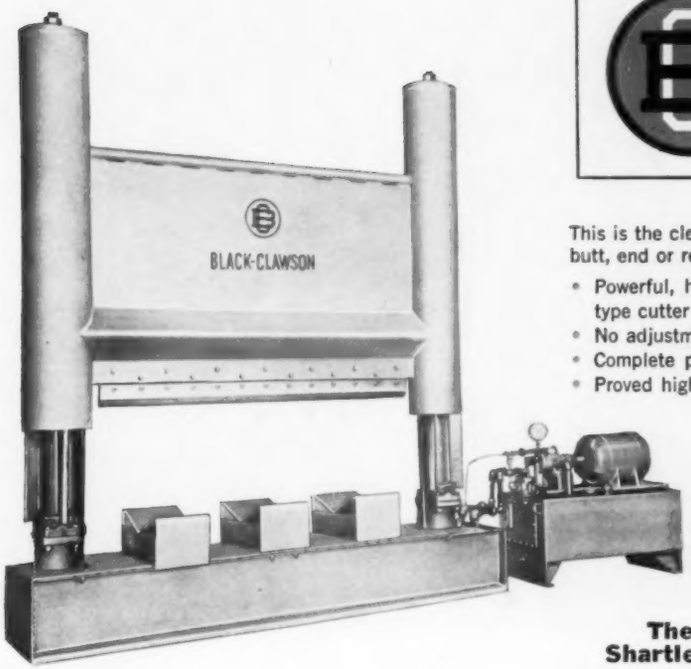
Portland: BUtler 5-2531 • Seattle: ADams 2-1336

How to Split Rolls with Ease and Speed

HYDRAULIC ROLL SPLITTER

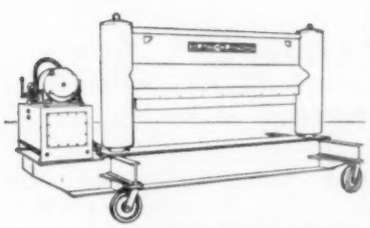


This is the clean, efficient, modern way to split pulp rolls, butt, end or reject rolls for fast, economical repulping.

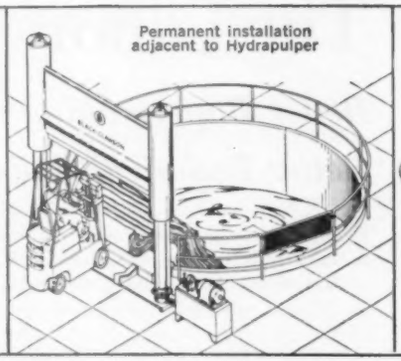
- Powerful, heavy duty hydraulically actuated guillotine type cutter
- No adjustments for variations in roll diameters
- Complete package with power unit, base and controls
- Proved highly successful in many mill installations
  - Safe... easy to load
  - Easy to operate... a one-man job
  - No noise, dust or frustration

Write or phone the Shartle Division for complete details.

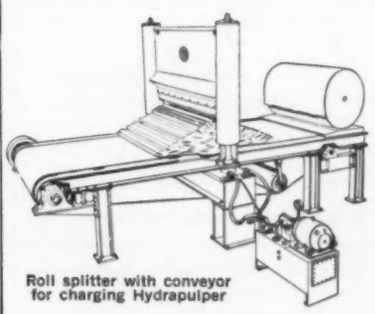
The Black-Clawson Company
Shartle Division, Middletown, Ohio



Portable roll splitter for use in several locations



Permanent installation adjacent to Hydrapulper



Roll splitter with conveyor for charging Hydrapulper

Single Source for Stock Preparation Machines & Systems

BLACK-CLAWSON

The Labors of Hercules

Better Papermaking Chemicals

Better Technical Assistance

Mythology—*Becoming a hero in Greek mythology was apparently not easy. One of the twelve labors assigned to legendary Hercules was to transport the famous Cattle of Geryon to greener pastures. While this may have seemed a simple job, its execution called for Hercules to singlehandedly build roads and causeways as he drove the herd through previously untravelled territory.*

Progress—Unlike the Hercules of mythology, modern Hercules doesn't have to build roads to transport its papermaking chemicals. By highway and rail, high-quality chemicals, manufactured under exacting quality control measures, are available to you when and where you want them. To insure a dependable supply of these products for you, Hercules maintains plants and warehouses strategically located from coast to coast wherever papermaking chemicals are required. In addition, Hercules conducts a continual research and development program, at four separate laboratory locations and offers the assistance of over fifty field specialists highly trained in papermaking techniques. The modern Hercules is ready to labor on your behalf.

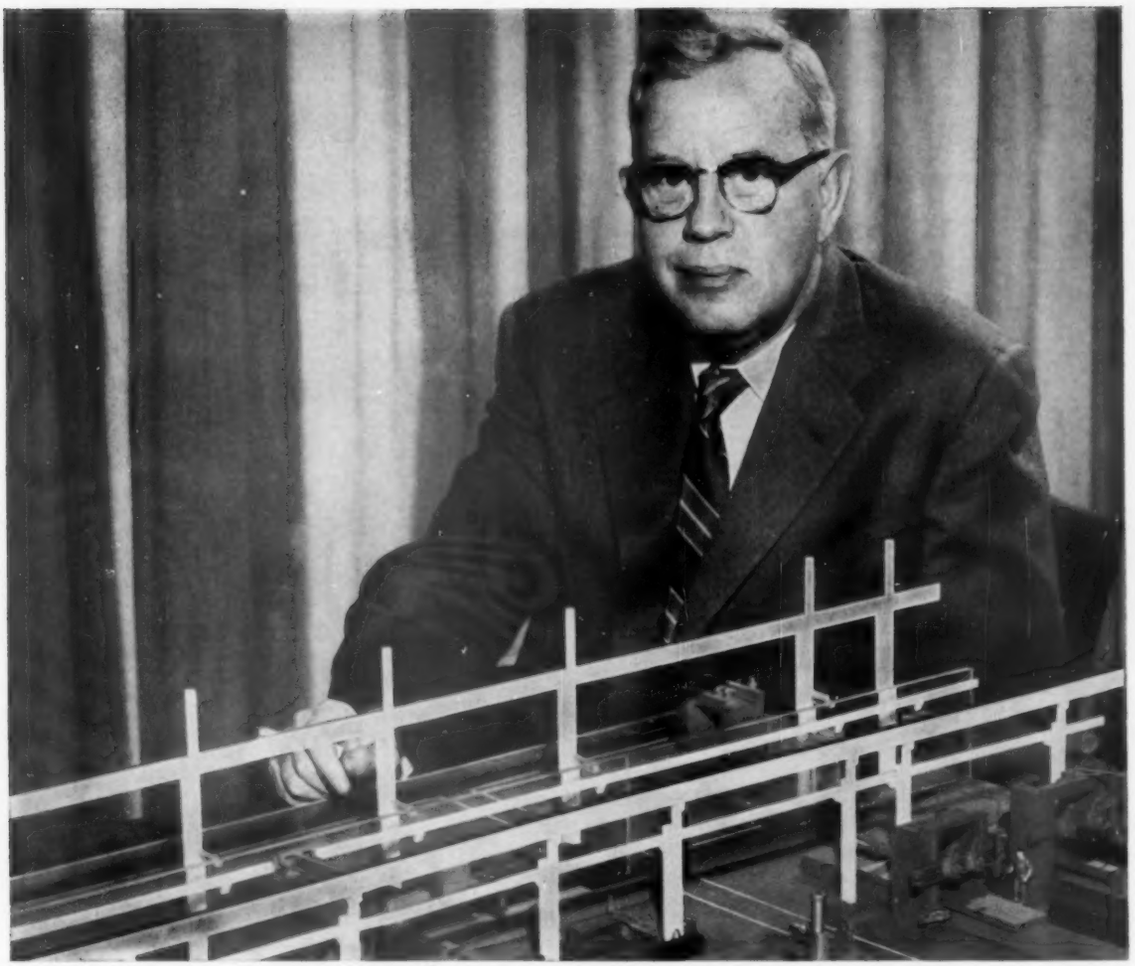
PP60-1

Paper Makers Chemical Department

HERCULES POWDER COMPANY

INCORPORATED

Wilmington 99, Delaware



J. W. MILLER PHOTO

Beloit Eastern's Bill Wood

Looking over a model of the newly modernized shops at Downingtown, Pennsylvania, is Beloit Eastern Corporation's president, W. S. Wood. Bill and his staff are experts, not only in designing the finest equipment, but also in its meticulous founding and manufacture. Modern methods, increasing the plant's effectiveness as "your partner in papermaking," result in the finest of equipment designed and built for long, rugged, and dependable service. Call on us for your finished product processing equipment needs.

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Winders • Petite Winders • Slitters Supercalenders • Roll Wrappers Roll Lowering Tables • Roll and Shaft Handling Equipment • Conveyors Unwind Stands and Tru-Tension Controls • and other equipment for the paper and allied industries.

BELOIT EASTERN CORPORATION

DOWNINGTOWN, PENNSYLVANIA

Member Beloit Group

A SKILLED HAND IN CHEMISTRY...AT WORK FOR YOU

SEEKING IMPROVED PAPERS?

NOPCO POINTS THE WAY

Nopco points the way to quality products in pulp and paper operations. Nopco offers a full line of paper chemicals, each specifically designed to yield better products . . . every time . . . with dependability you can count on.

Perhaps the skilled hand of Nopco can go to work for you. Back of every chemical made by Nopco for the paper industry stands Nopco Technical Service—an experienced staff ready to assist with laboratory data and recommendations based upon your specific requirements.

DEFOAMERS	FELT WASHING DETERGENTS
WAX SIZES	CALENDER STACK LUBRICANTS
COATING ADDITIVES	ANTIBLOCKING AGENTS
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NOPCO CHEMICAL COMPANY
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ME* can do!

During your next planning pow-wow on a forthcoming project, consider this challenge (ME* Can Do!) from a tribe of "Injun-eers" who make motors and generators their only business . . . and who have been successfully conducting this business on product merit for nearly 50 years.

Feathers in our bonnet include some of the world's most honored projects and our scalp belt includes a multitude of the leading names in industry, but the Chiefs at ME* are more interested now in what ME* can do . . . for you!

Wherever you are, whatever your requirements, there's an ME* Sales Engineer ready to visit your reservation, sit in at your council fire and discuss your requirements . . . help you with your planning . . . prove the superiority of Marathon Electric Motors and Generators.

This data and specification file on Marathon Electric Motors and Generators is now available for your ready reference use. May we mail you your free copy now?

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BARREL-TO-BEARING
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the "moving force" of production!

More and more, cost-conscious plant men are recognizing modern lubrication as an important "production tool." No longer do they see it as a simple maintenance problem.

With the years-ahead Alemite Barrel-to-Bearing Lubrication method, today's leading manufacturers are stepping up production . . . reducing downtime . . . extending machine life.

Included in a complete Alemite barrel-to-bearing lubrication method can be electric, air or hand-operated equipment. It will more than meet every need for high-pressure lubrication, filling hydraulic systems, servicing oil reservoirs, lubricating gear housings, and refilling grease guns.

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STEWART-WARNER CORPORATION

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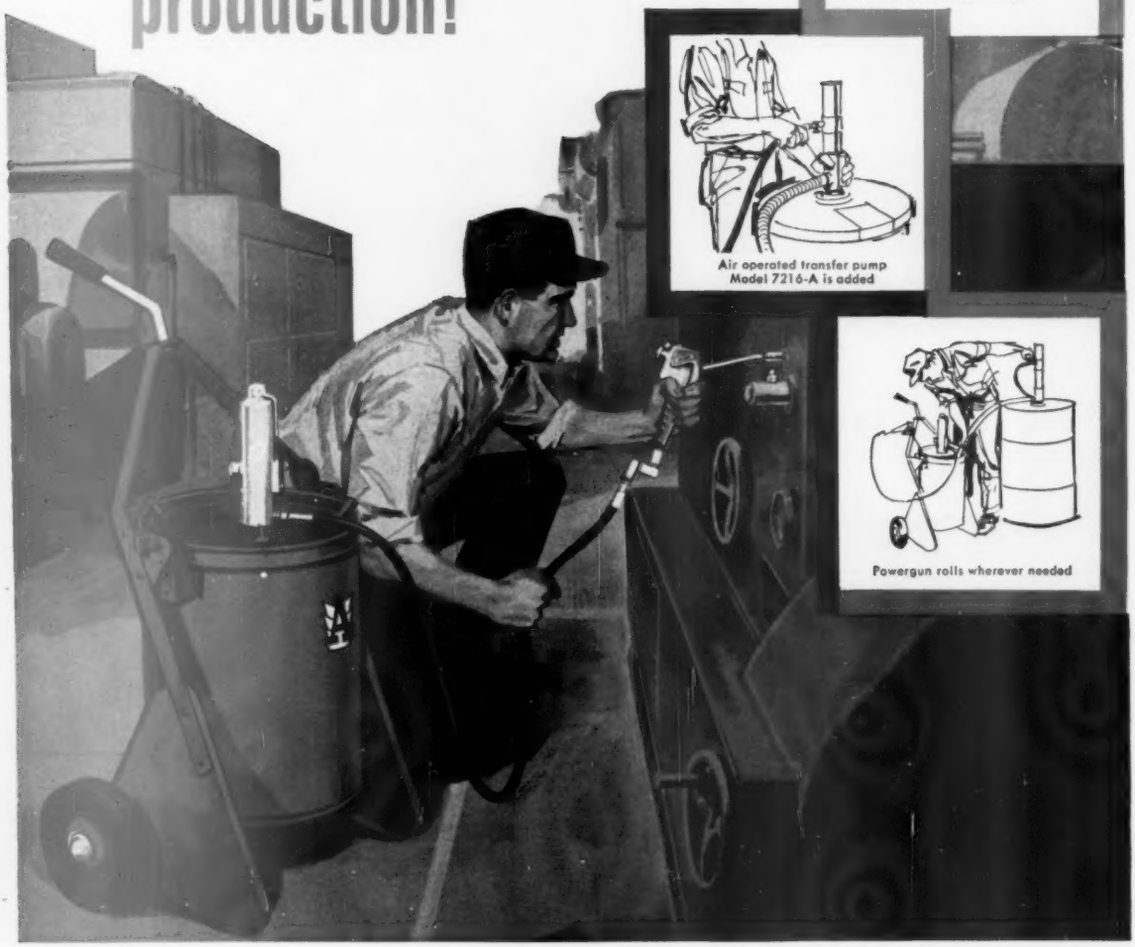
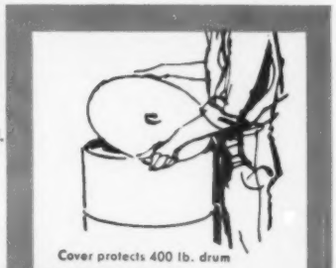




Cover protects 400 lb. drum

Air operated transfer pump Model 7216-A is added

Powergun rolls wherever needed

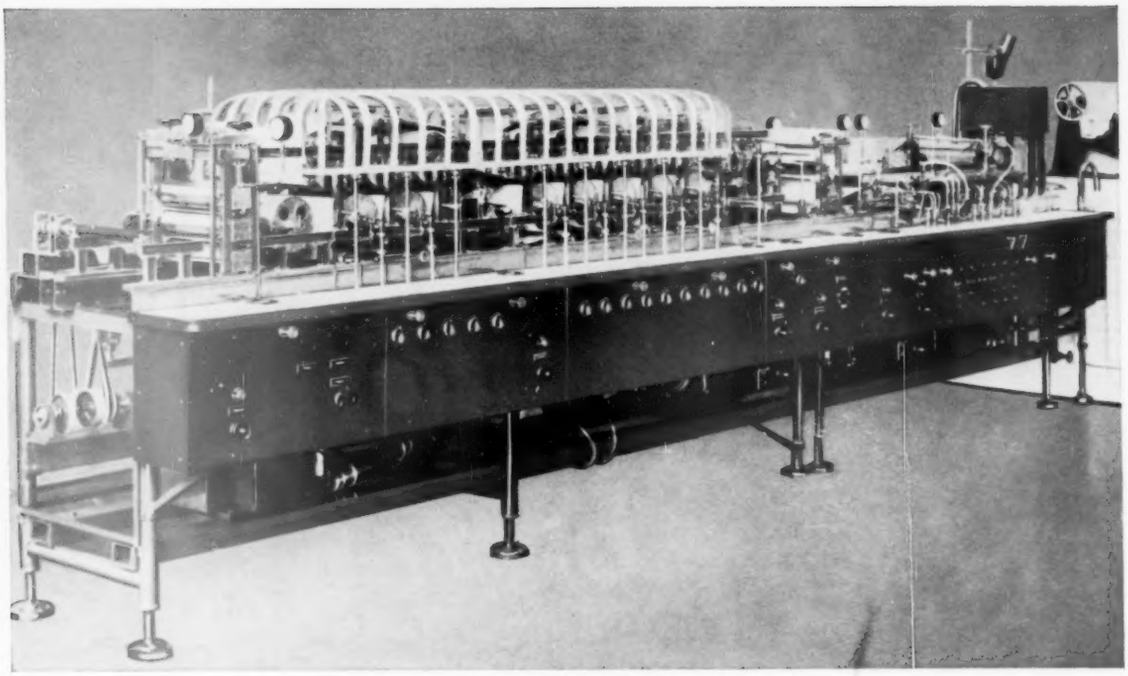
UNITANE® Titanium Dioxide

O-110 IS THE POSTMAN'S BEST FRIEND!

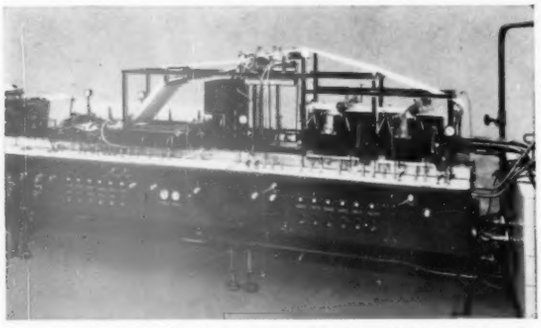
It takes a load off his shoulders . . . makes low basis weight papers more opaque . . . keeps publishers mailing costs down. Ask your Cyanamid Pigments representative about UNITANE O-110.

CYANAMID

AMERICAN CYANAMID COMPANY, Pigments Division
30 Rockefeller Plaza, New York 20, N. Y.
Branch Offices and Warehouses in Principal Cities



NEW P&W MIDGET FOURDRINIER PAPER MACHINE



The standard P&W Midget Fourdrinier model can also be operated in combination with miniature cylinder molds to provide more versatile sheet formation experiments.

Present users of the P&W Midget Fourdrinier Paper Machine include: West Virginia Pulp & Paper Co. • U. S. Dept. of Agriculture—Peoria Lab • Nat'l Bureau of Standards—Washington • Hurlburt Paper Company • E. I. Dupont de Nemours & Co., Inc. • R. J. Reynolds Tobacco Company • Forest Products Lab.—Philippines • Forest Products Lab.—Pakistan • U. S. Naval Laboratory.

Permits Precise Small-Scale Test Runs of a Wide Variety of Paper Formulations

As little as 5 lbs. of stock is all it takes to start the P&W Midget Fourdrinier making a continuous sheet of paper which can be successfully duplicated on a full-size paper machine. Such test runs effect a significant saving in raw materials, manpower and production machine time.

The P&W Midget Fourdrinier is also of special interest and value to educational institutions and technical laboratories. It is safe, clean and easy to operate. One man only is needed to adjust temperatures and pressures for a wide variety of paper making experiments.

SPECIFICATIONS

Paper Quality—Comparable to full-size Fourdrinier products
Weight of paper—12-120 lbs.
Output—up to 3.3 lb./hr.
Speed—2-8 ft./min.
Overall length—14 ft.
Overall width—33 in.
Working width—9 in.

Write for full descriptive literature.

THE PARSONS & WHITTEMORE / LYDDON ORGANIZATION

World leaders in the development of pulp and paper mills for the use of local fibers

18-19 Savile Row, London W. 1, England

5 Rue Jean Mermoz, Paris 8°, France

250 Park Avenue, New York 17, N. Y.

The alternate to this is . . . DOWNTIME!

An ounce of prevention . . . can eliminate *downtime* in your plant. With today's highly mechanized manufacturing and distribution methods . . . *downtime* of materials handling equipment can mean the difference between a profit or a loss.

A Clark Dealer *Continuous* Maintenance Program, available from 113 Clark dealers across the continent, offers you the most effective, and economical method of reducing costly *downtime*. Here's why!

In brief, a Clark Dealer Continuous Maintenance Program offers you:

1) . . . regular maintenance on your industrial trucks on a *programmed* basis. Scheduling is conveniently set up for your particular operation. If you like, service to your equipment can be done at night or at any other time when your equipment is not in use. The additional cost for this off-shift service is a small percentage of the cost of *downtime*.

2) Clark dealers, with the aid of a national service personnel training program, assure you that the best trained mechanics in the industry will service your equipment. These highly trained specialists perform a minimum of 22 separate inspections on every truck serviced. They not only perform the normal jobs of greasing and oil changes, but also make all necessary adjustments to your equipment. Most important, they report the condition of your machines, anticipating failure before it happens. As a result . . . *downtime* is drastically reduced.

3) A Clark Dealer Continuous Maintenance Program gets you out of the repair and maintenance business. It eliminates the need for special tools, parts stock and use of valuable plant space for servicing facilities.

4) A Clark Dealer Continuous Maintenance Program is economical. It actually costs less than similar service on your own automobile. This is an inadequate comparison, however, when you consider the small cost of preventive type maintenance to the cost of *downtime*.

For detailed information on a Clark C.M. program call your local Clark dealer (he's listed in the Yellow pages) or write: C.M. Service, Clark Equipment Company, Battle Creek, Michigan. No obligation, of course.

CLARK® EQUIPMENT

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R.T. VANDERBILT CO. N.Y. · AMERICAN PRODUCTS · RAYOX

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For maximum
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BRIGHTNESS
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PRESENTING DAILY DEFECTIVE PAPER, WASTE AND MACHINE EFFICIENCY REPORTS. Author of this article, seated at desk at right, is reading reports. Opposite him, in white shirt, at desk at left, is Leonard Parkinson, Rhinelander's paper mill supt. Third man from right is George Sutton, assistant paper mill supt. Others are paper machine, supercalender and rewinder dept. day supervisors.

Achieve Dramatic Savings

Production analysis at Rhinelander. In 18 months waste was reduced by 43%. Machine efficiencies meanwhile were increased 10%.

By JOHN KAY
Manager, Production Analysis and Service Dept.
Rhinelander Paper Co., Division of St. Regis Paper Co.
(Especially written for PULP & PAPER)

● **"A reduction of waste of as little as 10% would reduce the waste in our finishing operation by approximately 900,000 lbs. per year, and each 1% increase in paper machine efficiency will increase total machine production upward of 1,250,000 lbs. per year."**

So states an excerpt from a production analysis report at Rhinelander Paper Co. It reflects facts that were mere guesses 25 years ago. But today and everyday, top management, mill supervision and machine tenders alike have at their finger tips readily understood information on yesterday's output—information that they use to improve today's production.

The importance of swift and accurate production analysis becomes apparent when one considers that Rhinelander produces over 50,000 tons of glassine, greaseproof and sulfite specialty papers annually on eight paper machines, in dozens of basic grades and hundreds of variations. The tonnage figures may appear small when compared to mills in other branches of the industry, however the number of paper machine grade changes are upwards of 3,600 per year—and there is much processing involved in the manufacture of glassine.

After the initiation of Rhinelander's cost system in 1936, it soon became apparent that **cost control was a prerequisite to cost reduction.** In 1938 there were five paper machines, 10 supercalenders, 9 rewinders and three sheet cutters. Rewinders and sheet cutters were operating around the clock, and it was frequently necessary

. . . DRAMATIC SAVINGS AT RHINELANDER

PREPARING DATA TO BE PRESENTED at Rhinelander's morning meeting on production and waste. John Kay, the author, standing, directs members of his production analysis staff.

CHECKING RECORDING TACHOMETER and posting department and operator productivity report is Rewinder Dept. Foreman R. Seidel.

to operate the supercalenders on Sunday to reduce the stockpile from the machines. Using present day methods of determination, the overall machine efficiency at that time was low. Waste in the finishing operations was high, and output per man hour was only a fraction of what it is today.

Waste Reduced 43%

Early in 1938, the company president at the time approached the writer and asked him to accept the task of developing a waste and production control program. Duties of this department were to determine the cause of our paper losses, to develop ways and means for control and to suggest corrective measures. Initial efforts were devoted entirely to the reduction of waste, to the improvement of the mechanical qualities of the product, and to improve customer acceptance of the company's products.

In 18 months after the initiation of this program, waste was reduced 43% —from 17% af all paper worked on in finishing operations early in 1938 to under 10% in 1939.

It took a longer period of time to raise productivity in the finishing areas and to improve machine efficiency. Overall machine efficiency, including trim and speed losses, in 1938 was less than 80%. By 1946 it averaged approximately 90% on six paper machines. An important contribution to this increase was the reduction of lost time and down time from 90 hours per machine per month to 34 hours. Waste, productivity and efficiencies remain at essentially these values today despite many additional grades and two additional paper machines.

Service provided by Ripco's Production Analysis Department includes the following duties:

1. Determine paper machine production losses due to down time and lost time.

2. Calculate production losses due to machine and operator inefficiency.

3. Calculate production losses due to sub-standard trims and speeds.

4. Establish base measurements for production standards for subsequent operations.

5. Determine worker's and department productivity.

6. Process finishing department condition of parent roll reports to determine extent of excessive and preventable paper losses.

7. Maintain continuous records and prepare a recap for management, department heads and department bulletin boards.

8. Gather information needed for cost analysis of each individual run, and point out areas that need management's attention.

Log Reports Redesigned

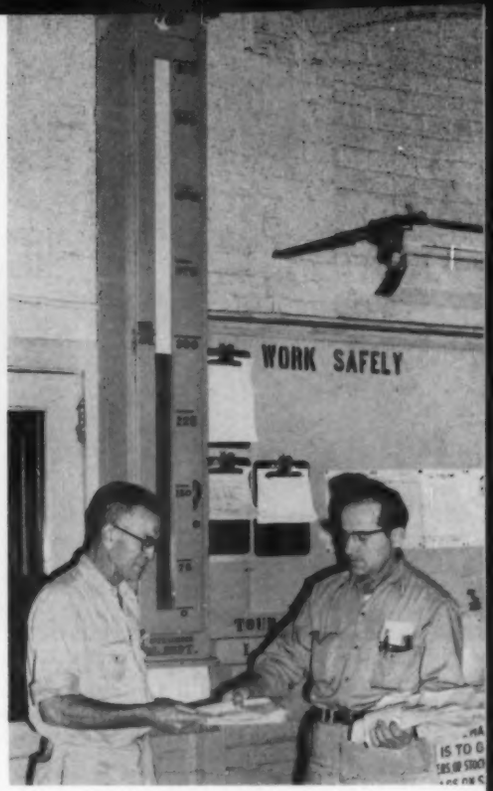
To meet the needs of the production analysis department for data and to facilitate the determination of paper machine production and paper losses and the output of subsequent operations, production (log) reports were redesigned, and "condition of parent roll" reports were adapted. The fundamental purpose of these new reports was to determine the extent of off-quality paper in its various categories and to provide supervision with the factual material needed to institute corrective action.

The employment of: 1—a "condition of parent roll" report, 2—development and adoption of standardized operational procedures, 3—prompt transmission of performance data to production personnel, and 4—a systematic and diligent follow-up program resulted in the marked performance improvement mentioned earlier.

The whole program also revealed many equipment limitations and numerous deficiencies in operating methods. A comprehensive analysis of the various manufacturing operations pointed out the need and the way for corrective action.

Daily meetings with supervisors and department heads are held, at which time a representative from the production analysis department presents a detailed report of the overall machine efficiency by grades. The analysis discloses the production losses due to lost time, machine and operator inefficiency, sub-standard trims and speeds, and the losses due to down time for clothing, repairs, etc. A report is also presented indicating output and productivity of finishing operations and the extent of the rejected paper and preventable paper losses. Factual information such as actual examples of substandard quality are also given

CALENDER OPERATOR (left) fills out production and condition of parent roll reports from information contained on roll tag. Backtender (right) filling out paper machine production report and recording weight from individual roll tag.



SUPERCALENDER DEPT. foreman T. Miller distributes exhibits of faulty paper. He has just finished adjusting waste meters and posting operator defective paper and productivity reports. That meter between men, like thermometer, shows paper losses slightly below normal average —300.

supervision for their presentation to the operators responsible.

Waste and production control is not a one-shot situation. It has been found that to be effective it must have the daily attention of management at all levels.

The dramatic savings to Rhinelander Paper Co. over the years have had but one effect upon the four employes in the production analysis department and that is to investigate further means to help production people improve their performance. The department has as its present goal to do something about the statement quoted at the beginning of this article: "A reduction of waste of as little as 10% would reduce the waste in our finishing operation by approximately 900,000 pounds per year, and each 1% increase in paper machine efficiency will increase total machine production upward of 1,250,000 pounds per year."
looms.

U.S.A. Will Be Host At World Forestry Meeting

Seattle, Wash. . . . The U.S. Government will be host to the 5th World Forestry Congress in Seattle Aug. 29 to Sept. 10, 1960. Preparations are being made by an organizing committee in collaboration with the Food and Agriculture Organization of the United Nations and other interested agencies. The 1960 Congress will be the first held in the Western Hemisphere.

Delegates will exchange ideas on the latest techniques in forestry, discuss forestry and wood industry problems and progress, see American's forest and wood using industries and scenic parks and visit forest experiment stations and research installations.

Meetings will be held on the campus of the University of Washington in Seattle.

Former World Forestry Congresses: Rome, 1926; Budapest, 1936; Helsinki, 1949 and Dehra Dun, India, 1954.

Official delegates of governmental representatives of international organizations, members of societies, agencies and institutions, technicians, forest owners and industrialists; and others interested in forestry and forest industries will attend. The official languages of the Congress will be English, French and Spanish.

Tours will be offered in various major sections of the United States, to show a cross section of American forestry, forest conservation activities and the forest industries. Excursions will also be arranged.

Exhibits of forestry and the latest forest industry tools, machinery, and equipment, together with other education material on forestry and forest conservation, will highlight the Congress.

Inquiries may be made to: Dr. I. T. Haig, executive secretary, Fifth World Forestry Congress, c/o Office of International Conferences, Department of State, Washington 25, D.C., U.S.A.

High Interest in Waste Paper Symposium

Considerable interest is being generated in the Waste Paper Symposium that will be held at the Conrad Hilton Hotel, Chicago, June 7-8. This will be the first time such a gathering will be pointed at the three industries involved in the overall wastepaper picture: generators, collectors and users.

Until now, says a spokesman for the Waste Paper Utilization Council (sponsor of the sessions), each group has been going its own way.

Wastepaper is holding its own. In 1959 consumption was 9,200,000 tons, up almost 6% from 1958.

One of the important subjects of discussion will be a status report on wastepaper under the new Food Additives Amendment.

FOUR-STAGE BLEACH PLANT produces high-brightness pulp. Towers left to right: chlorinator with closed top; caustic extraction fed by thick-stock pump; hypochlorite housing cast iron thick-stock mixer, and high-density storage.

Last Word in Four-Stage Bleaching

—Chillicothe, Ohio

● High-brightness pulp to meet ever-increasing papermaking needs is being produced at the new 500-ton four-stage bleach plant of Mead Corp.'s Chillicothe division. One of the world's most modern, the operation has met the test of start-up, is running smoothly six months after inauguration.

The plant is housed in a buff brick building about 80 ft. high and covers an area of some 4,900 sq. ft.

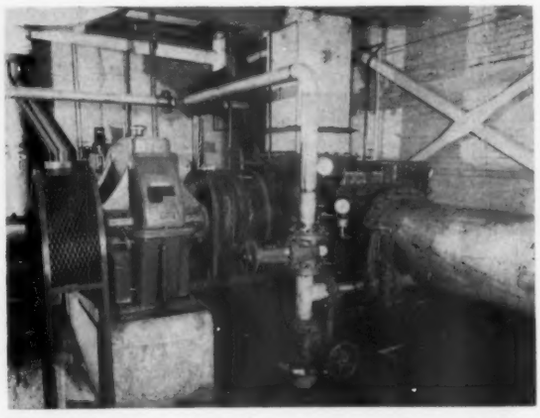
Highest GE brightness possible with the now-replaced three-stage system was in the 80-82 range. With the new plant—equipped to a great extent by Impco—that range possibility is 86-88 GE brightness. After processing, soda pulp is pumped to the top of a 36- × 55-ft. tile-lined steel high-density storage chest.

The bleaching sequence is: (1) chlorination, (2) caustic, (3) calcium hypochlorite and (4) chlorine dioxide. Native species (including maple, elm, oak, birch, beech and poplar) are used in production of a modified hardwood soda pulp.

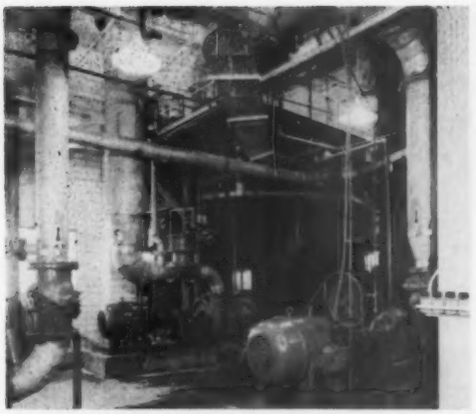
A plant feature is the location of washers some 34 ft. below the elevation of the tallest bleaching towers. Improved Machinery thick-stock pumps force stock from washers to tower tops. Mead engineers estimated recently that this design saved some 30 ft. in building elevation and at least one 20- × 70-ft. bay.

Bleaching sequence is as follows: Stock flow is measured through a Foxboro magnetic flow meter and controlled by a DeZurik V-port valve. Brown stock then passes through an Impco "wobble" type chlorine mixer

CHLORINE and pulp are combined before upflow chlorination tower, Impco Series 500 mixer. Note throttling valve for chlorine near inlet, U-tube, expansion joint.



STOCK IS RECEIVED from caustic washer and delivered to hypo mixer atop hypochlorite tower via thick-stock pump. Note pump-out and drain provisions.



MAZE OF PIPING. With Impco hypo tower at back, Warren stock pumps perform essential operation. Note tower drain, dilution nozzles, temperature inserts.

ORP CHLORINE CONTROL SYSTEM is feature of this view of chlorination tower's base. Note two Series 122 tower circulators.

at Mead's Chillicothe Mill . . . Hardwood

soda pulp is bleached with chlorine dioxide in modern plant

and up through an Impco pump to a 17- × 68-ft. chlorination tower. Stock flows by gravity from the top of the tower to the rubber-covered chlorination washer. (All four washers are 11½- × 16-ft. Impco units.)

After passing through a Series 500 Impco mixer, stock is handled by a thick-stock pump to a 14- × 50-ft. caustic extraction tower. It is then washed and pumped to the hypochlorite mixer, atop 18- × 80-ft. hypochlorite bleaching tower.

Stock is subsequently washed over a rubber-covered washer, passes through a Series 500 mixer, a thick-stock pump and into the base of the 18- × 74-ft. Kamyr up-flow chlorine dioxide tower. Chlorine dioxide is metered through a magnetic flow meter and added to the stock through two nozzles at the tower's base. Caustic soda is used as an antichlor in the chlorine dioxide stage and is added to the filtrate used for dilution in the launder.

Final pulp washing is over an 11½- × 16-ft. 317 stainless steel washer. Pulp is then pumped to the top of the 36- × 55-ft. tile-lined steel high-density storage chest.

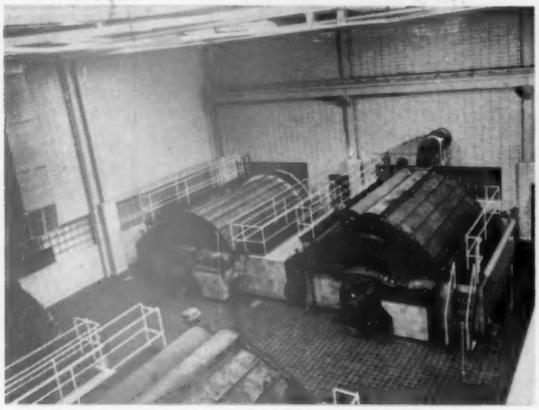
Chlorination is controlled by an O.R.P. cell.

Called the "heart" of the bleach plant is the 24-ft. graphic control panel supplied by Taylor Instrument

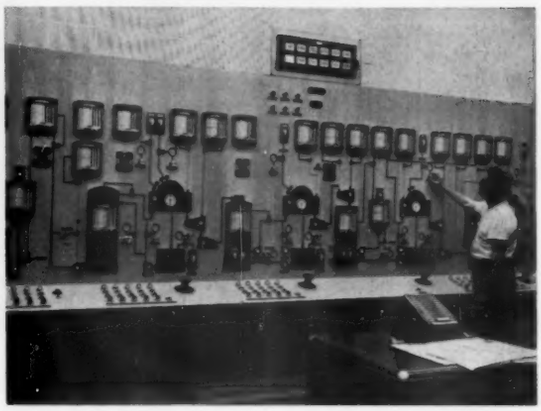
ALL CHESTS AND TANKS at Mead's modern Chillicothe, Ohio, plant were furnished by the Service & Erection Co.

DEEP INSIDE bleached high-density storage tank, Service & Erection supervisor inspects impeller. Linings are of VersaTILE.

. . . FOUR-STAGE BLEACHING AT MEAD



WASHER ROOM VIEW SHOWS FOUR IMPCO UNITS as follows (clockwise from upper left); NAOH; Cl_2; Hypo, and ClO_2.



HEART OF THE OPERATION is this Taylor Instrument graphic control panel from which operator monitors bleaching operation, chlorine dioxide generation.

Companies, from which the operator monitors bleaching operations and chlorine dioxide generation. The panel is housed in an air-conditioned control room.

Chlorine dioxide is generated by the Solvay process. Chemicals are filtered and pumped to lead-lined reactors by a Lapp Pulsafeeder unit. The solution is stored in two 15,000-gal. glass-lined storage tanks.

Responsible for installation of tile vats and chests and for tile linings was Service & Erection Co., Pittsburgh.

VersaTILE was utilized in all but one application—the chlorine dioxide tower, where lining consisted of a special acid-proof brick; the membrane 3/32-in. PVC; the total thickness 3¼ in., and the cement used polyester joining. This tower was sandblasted, care being taken each day to prime the sandblasted area. The PVC membrane was spark-tested to assure no breaks or pin holes prior to starting the acid-proof brick lining.

In most other applications (caustic tower, hypochlorite, hypo storage tank, high-density storage, ClO_2 washer, etc.) lining consisted of VersaTILE and grout, using either chemically-hardened Portland cement or polyester joining.

VersaTILE filled with reinforced concrete was used in the surge tank, caustic leg box, ClO_2 leg box, etc. In some instances, again, either chemically-hardened Portland cement or polyester joining was applied.

Total thickness of the caustic tower, hypochlorite and hypo storage tank is 3 in. Membrane used for the ClO_2 washer was 3/32-in. PVC saddles.

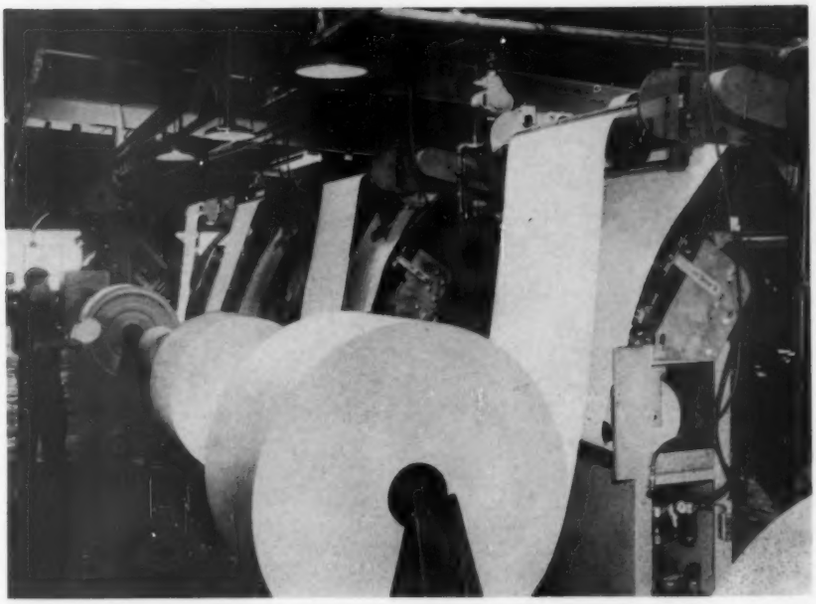
Water absorption of the acid-proof brick was limited to 3½% and acid solubility to less than 3%. These bricks were 3- × 6- × 9-in., all tongue and groove serrated three sides and designed by S&E to fit the curve of the chlorine dioxide tank. All were laid in polyester cement with a ⅛-in. layer between the back of the brick and the membrane.

PRINCIPAL SUPPLIERS

Pulp Washers, Bleaching Equipment: Improved Machinery Inc.
ClO_2 Bleach Tower Equipment: Sandy Hill Iron & Brass Works
Pumps: Goulds Pumps Inc., Warren Pumps Inc., Frederick Iron & Steel Co., Lapp Insulator Co., Milton Roy Co., Improved Machinery Inc.
Motors: Reliance Electric & Engineering Co., Westinghouse Electric Corp., Allis-Chalmers Mfg. Co.
Steel Bleaching Towers, Tanks: Chattanooga Boiler & Tank Co.
Rubber Lining (Chlorination Tower): United States Rubber Co.
Tile Washer Vats, Tower Lining, Tile Chests: Service & Erection Co.
Air Compressors: Ingersoll-Rand Co.
Air Dryers: Pittsburgh Lectrodryer div., McGraw-Edison Co.
Instrumentation: Taylor Instrument Companies
Power Sub-Stations: General Electric Co.
Motor Controls: Clark Controller Co.

Chlorine Dioxide
- *Reactors:* Knapp Mills Inc.
- *Absorber Towers:* U. S. Stoneware Co
- *Liquor Storage Tanks:* Pfaudler Co.
- *Refrigerator:* Croll-Reynolds Co. Inc.

Consistency Regulators: DeZurik Corp.
Control Valves: DeZurik Corp.
Stainless Piping: Bristol Metal Products Corp., Grinnell Co. Inc., Felker Bros. Mfg. Co.
Heating, Ventilating: J. O. Ross Engineering, division of Midland-Ross Corp.
PVC Fans, Ducts: Atlas Mineral Products Co.
Bridge Crane: Conco Engineering Works
Elevator: Otis Elevator Co.
Insulation (Towers, Tanks): Earl Paint Corp.
Chlorine Vaporizer: Whitlock Mfg. Co.
Miscellaneous Piping, Valves, Flanges: Grinnell Co. Inc., Saran Lined Pipe Co., Warren Pumps Inc., Frederick Iron & Steel Co., Lapp Insulator Co., Milton Roy Co., Improved Machinery Inc.
Structural Steel: Oregonia Bridge Co.



PAPER IS CONVEYED FROM MILE-LONG ROLLS to the top of the fabricating mechanisms, then to the bottom cylinder of the applicator and through the taping heads. The electrical-controlled units perform a dual role: apply the tape and print the instructions.

Upset-Proof Paper Plate

. . . revives lost art of picnicking. Superior Paper Products tackles one of backyard diners' major problems—aside from bugs

Picnic popularity is being revised by Superior Paper Products Co., Marion, Ind. With an assist from Minnesota Mining & Mfg. Co., the Hoosier firm has come up with a sure-fire solution to an outdoor eating headache—blowing, tipping and sliding.

Unable as yet to guarantee the absence of ants, Superior Paper Products *has* prevented upset by application of double-coated adhesive tape to the bottom of paper plates. The development is a boon to the industry, and at Marion alone production has increased 100%. For the first time in the 36-year history of the company, plates are being made in the fall and winter.

The customer merely removes the liner from the tape, presses the plate bottom against almost any surface, and Sta-Put stays put. Current daily production: nearly 500,000.

An Assist from 3M

Six specially-designed machines simultaneously apply the tape and printed instructions to paper from jumbo rolls. Automatic operation is not interrupted by roll change. Minnesota Mining & Mfg. engineers devised the equipment so that each tape measures exactly ¼ by ¾ in. The machines were made by Remmele Engineering Co., St. Paul, Minn., which adjusted each unit to work in time with the plate-fabricating equipment. The plates are formed *after* the paper is taped and printed. The tape consists of a tissue paper "backing" coated on both sides with a firm adhesive.

Operation in Sequence

The entire operation—carried out in sequence from the time the paper is conveyed to the time it is formed under heat pressure of 350° F—takes about 10 sec. Both taping and fabricating machines are designed to handle almost any tape and thickness of paper. Diameters of plates so far produced have been confined to 6¾ and 9 in. But, colors and designs are planned for future production—and perhaps various other sizes, too.

And, now for those ants.

SCATTERED ARRANGEMENT assures minimum waste. View shows underside of paper as machine pauses for application process. Used along with paper rolls are 288-yard rolls of "Scotch" brand double-coated pressure-sensitive tape.

"NATION'S HARDEST WORKING RIVER". The Wisconsin serves numerous mills, is controlled by an extensive system of dams that provides the uniform flow essential to the survival of industry. Above: the Castle Rack Dam and hydroelectric plant.

Water: Industry's Lifeline

. . . must be more efficiently used if pulp and paper is to retain economic stability over next 20 years. An expert comments

By WILLIS M. Van HORN
The Institute of Paper Chemistry, Appleton, Wis.

● United States water requirements will double within 20 years. Needs of industry will grow proportionately faster and will account for some 60% of all water used by 1975. (The current figure is some 40%.)

There is an absolute need for a uniform and continuous water supply in the expanding industrial community. Those communities must look beyond the current ground and surface supply and plan for an expanded physical plant to intercept more of the water now unused. In any water-using community, then, there are two major problems: (1) How water is to be used industrially, and (2) how to increase waters availability.

Presented at meeting of James River Basin Assn., Natural Bridge, Va.

Among the principal water-consuming industries, pulp and paper holds high rank. Manufacture of one ton of pulp requires some 25,000 to 75,000 gals. water; and, similarly, it may take up to 50,000 gals. to make a ton of paper. It is not uncommon, therefore, for a pulp and/or paper mill to consume as much as 20,000,000 to 30,000,000 gals. per day.

Natural Resources: 3 Categories

Natural resources can be placed in three general categories: (1) Nonrenewable, such as oil and other minerals; (2) renewable, such as pulpwood forests, and (3) stable or unchanging, the major one of these being water.

On the average, some 30 in. of precipitation falls on the U. S. each year, of which 21.5 in. return to the atmosphere either by evaporation or by use by vegetation. The remaining 8.5 in. runs off the surface of the land or through the ground and eventually back to the ocean. Only about ¾ in. of the total precipitation is intercepted annually and used directly by man.

WILLIS M. Van HORN: " . . . an absolute need for a uniform and continuous water supply in the expanding industrial community."

Multiple Use Doctrine

The Doctrine of Multiple Water Use accepts the fact that in an expand-

ing economy river water plays a vital part. It implies that in such an economy it may be unreasonable to confine a waterway to a single use. Rather, the stream should contribute to as many phases of the economy as possible—*providing any one does not create conditions that impair the quality of the stream.*

Crux of the matter is definition of the word "impair", and it becomes obvious that such definitions will depend on many variables inherent in any given stream. Stream classification systems have been derived, from this basic problem.

In their book "Technology in American Water Development" Ackerman and Löf have developed several categories of water use, some of which are quite competitive. First category is use by "withdrawal" (as in irrigation); second is "flow use", and third is "on-site' use (as in navigation and recreation). Withdrawal use is important to industry, although in the great majority of cases industry returns its withdrawn water to the stream. It is in the return of this water that the importance of "flow use" is so great to industry. One such use is the generation of power, and another is for disposal of wastes. It is in using a stream for the disposal of both industrial and sanitary wastes that a real problem in use competition exists. This is because using the stream for waste disposal may impair its quality for other uses. This problem of stream pollution abatement is so complex and so vast that its implications reach the roots of our economy.

Any industrial and or municipal community that depends on an adequate and continuing supply of water is obligated eventually to return such water in a manner not to impair the stream for others.

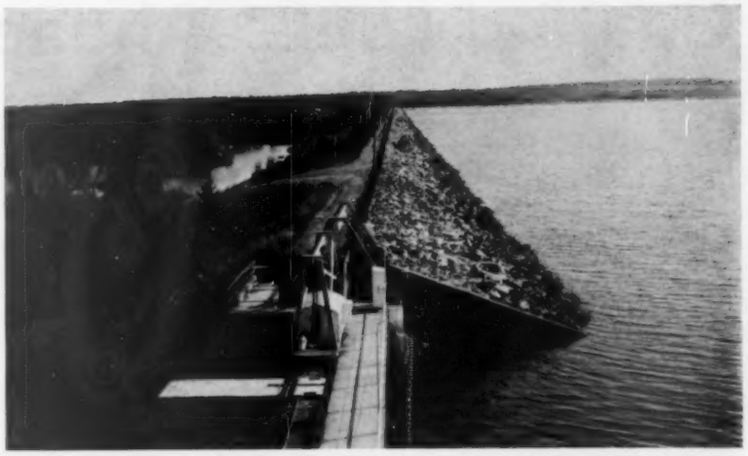
The versatility of a river in participating in the multitude of tasks required of it is in direct proportion to the volume of its descharge. It is axiomatic, therefore, that the more water there is in a stream, the more services that stream will perform.

Harnessing a River

Dams are among the most effective devices known for intercepting run-off. When used in either tandem or patterns in large enough numbers and strategically placed, they can almost capture a run-off and reduce fluctuation in stream discharge to a practical minimum. River systems have been harnessed in this manner. Perhaps the best known is the Tennessee and its tributaries. Is it possible and practical however, to manage a smaller river.

For example, the Wisconsin River system has some 21 storage dams and 26 hydroelectric dams. Added to these man-made reservoirs are natural lakes, which in many cases have small dams at their outfall, maybe only a few feet in height. All the dams in the system are operated by a master plan in such a way that the river almost always discharges at a minimum rate of about 2,200 cfs. The hydroelectric plants on the lower reaches are designed and built to operate on this uniform flow and have a maximum capacity of 118,920 kw. This water supplies process water and carries away the waste of 14 pulp and paper mills, among other industries. These industrial establishments could not possibly survive without the uniform flow of water provided by these dams. This river management program has been developed over some 50 years.

One immediate way, then, by which an increase of minimum flow can be achieved is to intercept more of the run-off and hold it for release in periods of low water. Most water-using industries design plants on the availability of water at minimum flows. Raising this minimum flow would not only insure the stability of those industries already present in the basin, but would also permit their expansion. This, of course, would then stabilize the entire basin economy by providing more employment and insuring a fuller use of other natural resources.



HOLDING RESERVOIR IS LIFELINE OF PULP AND PAPER. Above: impounding dam at the Eau Pleine reservoir, Wisconsin River.

Water Use by Other Industries

68,000 gals. = Steel in average automobile
27,000 gals. = Non-steel parts in average automobile
12,000 gals. = 100 gals. 100-proof alcohol
6,550 gals. = 1 ton rubber
470 gals. = 1 bbl. beer
250 gals. = 24 No. 2 cans lima beans
79,000 gals. to process and dye 1 ton cotton textiles.
800 gals. to tan 100 lbs. raw hides
710 gals. to process 100 hogs in slaughter
260 gals. to process 1,000 gals. raw milk

Minnesota Pulpwood Producer Independent of Waldorf

One of northwestern Minnesota's prominent suppliers of peeled pulpwood is Bagley Merchantile Barker Co. at Bagley. As reported in the April issue of PULP & PAPER (p. 106), this modern operation handles 100-in. aspen on an around-the-clock basis. Much of the same 45-car per week output goes to Waldorf Paper Products Co., St. Paul, Minn.

The Bagley concentration yard is completely independent and is in no way associated with Waldorf Paper Products—except on a contract basis. It was stated in PULP & PAPER's article that Bagley Merchantile Barker is a subsidiary of Waldorf-Hoerner Paper Products Co.

Not only is this not the case, the Waldorf-Hoerner joint venture is confined *solely* to the new Missoula, Mont. mill (see March PULP & PAPER). Otherwise, the firms are independent operations. The error was ours, and we regret that this misinformation was allowed to appear.

Coating Looks Ahead

More than 800 are expected to attend the 11th TAPPI Conference to be held in Chicago's Edgewater Beach Hotel

● Promise of major breakthroughs hovers in the air as some 800 coating experts prepare to attend TAPPI's 11th Coating Conference at Chicago's Edgewater Beach Hotel May 22 to 25. The industry definitely is on a coating binge. Since 1950, coated paper and paperboard capacity has grown from 2,300,000 to 5,000,000 tons.

Before the industry commits itself to more coating capacity, it wants a few answers—and it wants them now. TAPPI estimates an attendance of 800, but it may approximate 1,000. Good business conditions in the industry and increasing competition might help boost that figure.

According to one source, paper coatings alone consume more than 20,000,000 lbs. of resin per year and may double that consumption by 1963. Paperboard coatings use 3,000,000 lbs. now, and this is expected to soar to 50,000,000 lbs. At Chicago coating men will discuss how they can modify present pigments to meet the needs of the industry, especially in the narrow particle size range. There will be more talk of increased use of PVA because of new lower costs plus water solubility. Polyvinyl alcohol is a powerful adhesive with good holdout qualities.

The Blade Coater

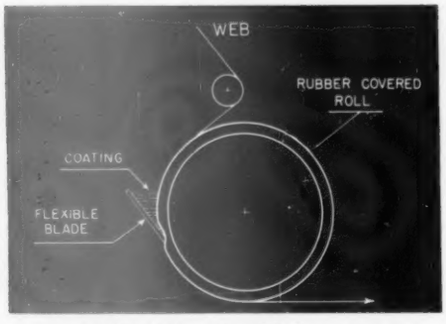
Up for serious discussion will be the trailing blade coater. The blade unit is said to promise better quality coating, smooth-surface without supercalendering at high coating speeds and at high solids. The blade coater is still in its evolution; and while the promise has been kept, it was at the expense of output and heavy capital investment.

There are indications that at the Chicago meeting coating men will exchange operating experiences regarding the three blade coaters now on the market (Rice Barton, Beloit and Black-Clawson). Each has several features that appeal to coating men. And to add to the confusion, new design improvements are being made almost every day.

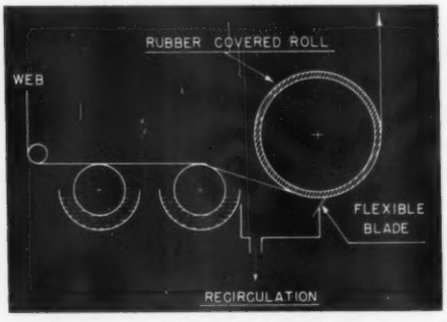
Delegates will learn about operating experiences on another blade coater, Champion's Champflex. Some technical men conjecture that Champion has not pushed this coater until now because it has had licensing agreements with many mills on what is known as the Champion Coater. But, that patent has run out, Champion may be seeking to recapture this market.

Champion's Champflex patent (No. 2,729,192) is a refinement over its Champion rod coater. A soft rubber-covered roll with a density of approximately 80-120 P&J is placed above the flexible doctor blade. This backing roll is moistened by a second distributor roll.

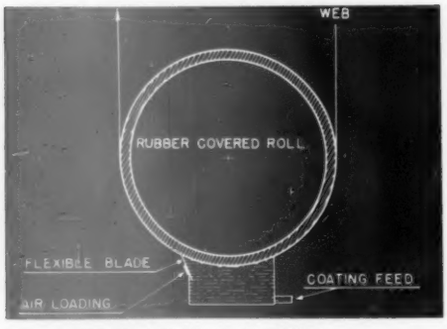
Charles C. Whelpton, considered to be Champion's top coating expert, will discuss some actual operating experiences of several mills using the Champflex. It is understood that a new southern mill will use one.



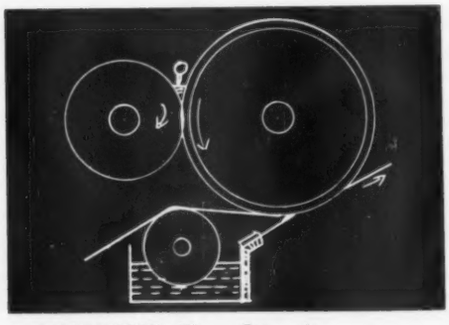
1. RICE BARTON trailing blade coater.



2. BELOIT's trailing blade contribution.

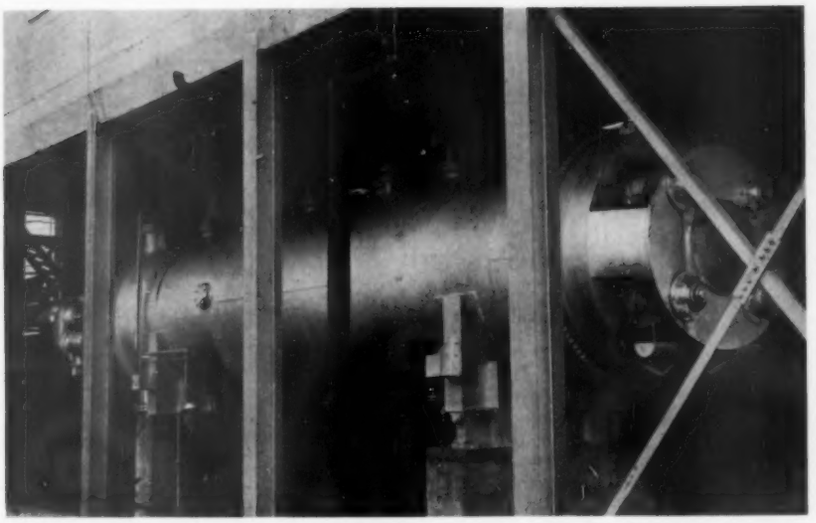


3. BLACK-CLAWSON's Flexiblade.



4. CHAMPION's Champflex unit.

Stainless Steel Castings



CONTINUOUS DIGESTER producing pulp for 0.009 corrugating board at Hartsville, S.C. plant of Sonoco Products Co. (U.S.A.). Unit employs unique duplex design that permits independent operation of each half.

. . . in continuous pulping are described in this exclusive report to PULP & PAPER. Where they are used and why

By E. A. SCHOEFER
Executive Vice President
Alloy Casting Institute,
Garden City, New York.

• Cast stainless alloys are playing a vital role in helping meet the need for increased production and quality in the paper and pulp industry. Greater product demand—paralleled by rising costs and a scarcity of raw materials—has turned the trend in paper manufacturing to continuous processing. Major advantages claimed are: greater yields, a uniform pulp of higher quality, materially reduced consumption of cooking liquors and power.

Severe service conditions are encountered with continuous cooking. Although chemical solutions are essentially the same as used with batch-type operations, higher production rates (which demand larger units and faster cooking,) have imposed harsher requirements on equipment. Increased temperatures and pressures, oxidation, organic wood acids released during cooking and high liquor velocity and turbulence accelerate corrosion of digester parts. These punishing corrosive conditions, coupled with chip abrasive wear encountered in the violent digester cycle, have out-moded such conventional materials of construction as plain carbon steel, non-ferrous metals and low-alloy steels.

To combat premature failure of digesters, stainless steel castings are being specified increasingly for critical pulp making components. These materials, because of their unusual corrosion and erosion resistance, contribute to overall efficiency and quality and reduce costly downtime for expensive capital equipment. Cast stainless also offers high structural strength and economical one-piece construction.

Of the principal methods of producing wood cellulose pulp, the sulfite process is the most violently corrosive since it involves calcium, magnesium, ammonium, or sodium bisulfite salts in a sulfurous acid solution. One of the biggest problems encountered with this process is the conversion of sulfite liquor to highly corrosive sulfuric acid in the presence of sufficient air. Scaling, which results from precipitation (such as calcium sulfate) from the cooking liquor, also intensifies attack. The use of nitric, sulfuric or phosphoric acid flushes for scale removal expose equipment to additional corrosive effects. Molybdenum-bearing grades of cast stainless, which exhibit high resistance to these acids, are especially recommended for digester fittings used in sulfite pulping.

The sulfate and neutral sulfite processes, with their generally alkaline liquors, are not as harshly corrosive to equipment as acid sulfite pulping. The sulfate process uses a mixture of sodium hydroxide and sodium sulfide in varying proportions. The neutral sulfite process employs a mixture of sodium sulfite and sodium carbonate, adjusted so that the pH of the solution is on the alkaline side. With both of these methods, however, the use of cast stainless parts is dictated by the need to resist accelerated corrosion from the increased temperatures and pressures encountered with quick-cooking practices.

When ordering stainless steel castings of a particular grade from the foundry, designers frequently and mistakenly specify an "equivalent" wrought grade type number. Actually, the chemical compositions of the cast alloys are significantly different from those of the wrought grades to provide for castability. To eliminate confusion, the Alloy Casting Institute has assigned designations to 31 standard grades of corrosion-resistant and heat-resistant cast alloys (identified by the initial letters C and H, respectively).

Types CF-8 and CF-8M (or its modification CF-12M) are the most widely used for pulp mill applications.

Both alloys contain at least 18% chromium and 8% nickel and are partially ferritic in structure. The CF-8 type is normally used under oxidizing conditions. The molybdenum-bearing CF-8M alloy displays excellent corrosion resistance to weakly oxidizing and reducing media, and to pitting-type corrosion.

For The Kamyr System

One of the continuous processes gaining favor in production of kraft or semi-chemical pulp from both softwoods and hardwoods is the Kamyr (Sweden and U.S.A.) continuous cooking method. The Kamyr unit is a vertical vessel and, unlike conventional digesters, is operated full of chips and liquor at all times. The digester is also unusual in that the hydrostatic pressure is maintained to eliminate any vapor space at the top.

A typical recent installation of this system is the 175-ton-per day pulp mill of the Eastern Fine Paper div. of Standard Packaging Corp. at Lincoln, Maine, U.S.A., which produces highly uniform kraft pulp for fine business paper. The basic rating of this unit in terms of softwoods is 150 tons per day, but it will handle up to 200 tons per day of hardwood.

To satisfy rigid performance requirements, Kamyr uses cast stainless alloys for the chip meter rotor, low-pressure feeder housing, high-pressure feeder housing, rotor and ends, top separator cover, outlet device cover and bottom disc strainer.

At this plant chips from storage are fed into the system through a chip meter, which volumetrically controls the production rate of the digester. The chips at atmospheric pressure then pass through the low-pressure feeder and into the steaming vessel, where a pressure of 15-20 psi is maintained.

The low-pressure rotary vane feeder housing is cast from ACI type CA-40 stainless and weighs approximately 1,400 pounds (Fig. 1 shows a similar feeder from another Kamyr installation). This grade was chosen for its hardness and corrosion resistance. Because of its high carbon content (0.20-0.40), type CA-40 can be hardened to a maximum of about 500 BHN. This alloy, in fact, displays the highest hardenability of all the standard stainless steels, cast or wrought. When properly heat-treated, tensile strengths of up to 220,000 psi can be attained. Type CA-40 also displays its maximum corrosion resistance in the fully hardened condition.

The low-pressure feeder acts as a seal against pressure from the presteaming chamber. The principal corrosive is the turpentine, though the steam used is blow-off steam from the digester itself and may contain entrained kraft liquor. Upon entering the steaming vessel (58-in. dia. and 25 ft. long), the chips are subjected to a fairly low (about 15-20 psi) steam pressure that drives out entrained air and non-condensables.

At the end of the horizontal presteaming vessel chips drop through a chute and into a high-pressure rotary vane feeder. The kraft white liquor and black liquor for the digestion process are metered into the feeder and maintained at the volume required to carry the chips into the digester. In addition to feeding, the rotary unit seals against a pressure difference between the digester at 165 psi and the pre-steaming vessel at 20 psi.

This seal must stay tight, and the use of stainless steel for feeder parts contributes to long maintenance-free life.

Stainless castings are used for the rotor, housing and ends of the high-pressure feeder. Type CF-8M was selected for the 1-ton rotor. This molybdenum-bearing grade provides exceptional corrosion resistance to attack by the kraft liquors and wood acids encountered.

Chips settle by gravity in the digester, and digested pulp is withdrawn from the bottom. Passing down through the 74-ft.-high vertical tube, chips reach a mid-point heating zone with a temperature of approximately 310°F. A short distance below that they reach a second heating zone, where the temperature is raised to 340°F.

Passage 3½ hours

Passage through the digester requires about 3½ hours. At the end of that time, digested pulp is ready to emerge through the bottom outlet system. This consists of a cover (outlet device), ball valves, strainers to remove excess liquor and an adjustable orifice arrangement. The cover is channeled to permit pulp flow, and bears impeller arms to promote flow in the bottom of the digester.

Thermal cycling is thought to be one of the major causes of corrosion in conventional batch digesters. Exposure to vapor is another cause of corrosion. One authority has pointed out: "With regard to corrosion in these (Kamyr digester) vessels, the absence of a vapor space and the elimination of thermal shock have markedly reduced the corrosion that is a problem in batch vessels. Some non-condensables do collect in the upper portion of the digester as has been evidenced by corrosion of the digester top head where it has been made in mild steel. Replacement with 18-8 (CF-8) stainless steel seems to have eliminated these troubles."

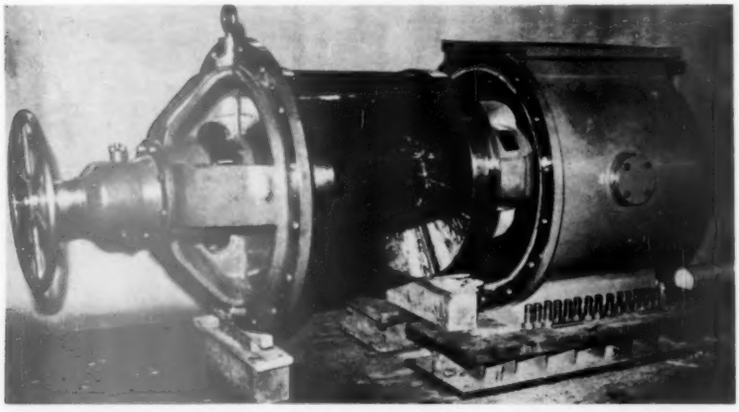


FIG. 1—LOW-PRESSURE FEEDER IS CAST from CA-40 stainless. Kamyr unit operates at 240° F. and withstands 30 psi steam.

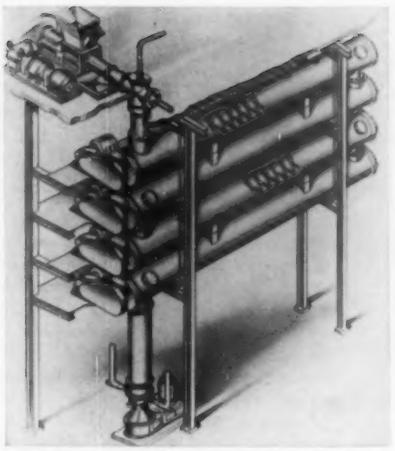


FIG. 2–STAINLESS castings are used at both ends of Pandia Chemi-Pulper.

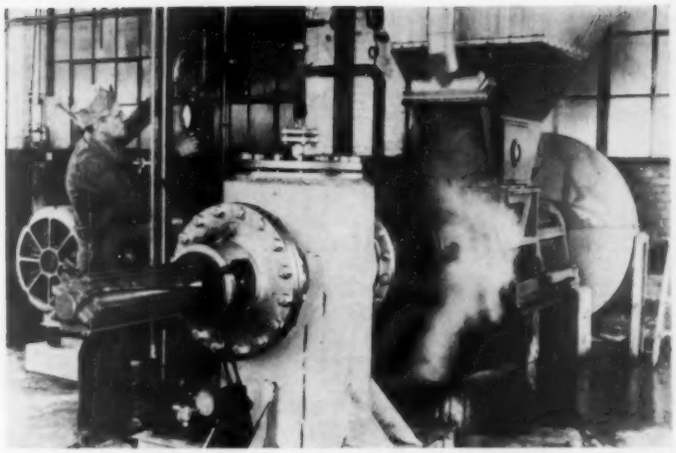


FIG. 3–CAST STAINLESS SCREW FORCES CHIPS FORWARD in this Pandia screw feeder in operation at Crandon Paper Mills Inc. (U.S.A.)

For Black-Clawson System

A novel approach to the problem of continuous pulp digestion has been made by Black-Clawson Co. (U.S.A.) and Black-Clawson International Ltd. (England), with digesters consisting of several horizontal passes. One such unit is the Pandia Chemi-Pulper, used to process both hard and softwoods. These systems employ both the neutral sulfite semi-chemical method and the sulfate process. The number of horizontal tubes employed in a Pandia continuous digester (Fig. 2) is varied to suit the requirements of the final products and the raw material, which can be wood chips veneering, shavings, coarse sawdust or several varieties of agricultural residues and native grasses. The material to be pulped is fed into a screw feeder (Fig. 3) and delivered through a plug tube into the first section of a continuous digester. The chips in the plug tube form a seal against the pressure inside the digester, as shown in Fig. 4. The screw itself is cast from either type CA-15 or a special stainless alloy to resist abrasive wear and the corrosive action of the wood acids.

Time required to complete the cook varies from 2 to 60 mins., depending on starting material and the type of pulp required. The tubes can be supplied in diameters of 18 to 60 in. and in lengths varied to suit process requirements. At the end of each tube, or pass, chips simply fall into the next until, on the final pass, they are dropped into a discharger.

The primary function of the discharger is to transfer the cooked pulp from the high-pressure zone of the digester to atmospheric pressure in the blow tank. A constant-speed impeller, turning horizontally, is located in the pressure zone of the discharger. This impeller wipes the face of an adjustable orifice in the discharger. The flow of steam through this orifice carries the cooked pulp into the blow tank. This sequence of operations is shown in Fig. 5. Both the impeller and the top casing of the discharger are cast of stainless steel alloys—either CF-8 or CF-12M.

The molybdenum-bearing grades (CF-8M, CF-12M) are used where

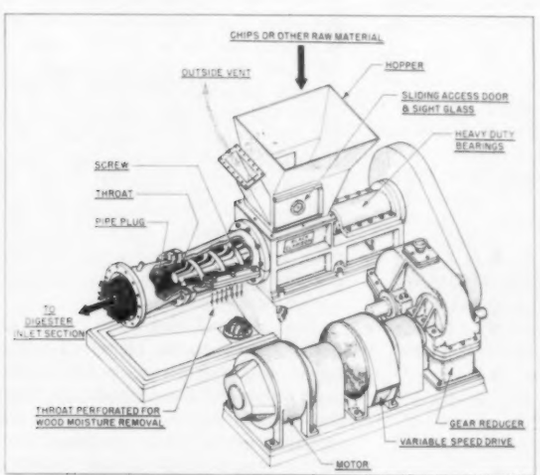


FIG. 4–CHIPS IN THE PLUG TUBE FORM A SEAL against pressure inside the Pandia Chemi-Pulper.

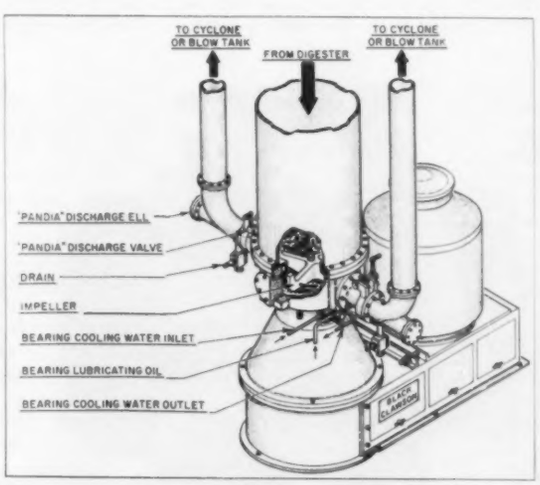


FIG. 5–IMPELLER ACTION completes pulp discharge to blow tank. Impeller and top casing are cast from stainless.

maximum corrosion resistance is needed in continuous pulp processing.

At a typical installation of the system (American Box Board Co.'s Filer City, Mich. plant) 375 tons per day of semi-chemical pulp for 0.009 corrugating is produced from aspen. Two continuous digesters, employing a total of 12 tubes, each of which is 20 ft. long and 3 ft. in diam., are used. Neutral sulfite semichemical liquor at 170 psi and 375°F cooks in 12 mins.

For Asplund Defibrator System

A different approach to continuous pulp processing has been made by American Defibrator, Inc. (U.S.A.) and AB Defibrator (Sweden), whose digesters employ one or more horizontal tubes. Producing a variety of pulps from hard or softwoods and bagasse, about 20 of these units are in service. Like the installation at the plant of Continental Can Co., Hopewell, Va., U.S.A., most are used with neutral sodium sulfite liquors.

At Hopewell 250 tons of corrugating medium can be produced a day. Semi-chemical liquor is used to cook the mixed hardwoods (about 50% oak, with the balance made up of sweet gum, red maple, yellow poplar and others). About 85% of the furnish for the corrugating medium is produced from the resultant pulp. Kraft pulp makes up the remainder. Based on operating experience, the cooking liquor used is a mixture of sodium sulfite and sodium carbonate in the ratio of 3:1 by weight, with a pH at the end of the cook of about 7.2 to 7.4.

In operation, chips are picked up from the hoppers by feed screws having constant shaft diameter throughout their length, but with threads that decrease in diameter in the direction of travel of the chips. The profile of the screw fits a tapered throat section in which chips are compressed to form a plug, sealing the feed hopper from the steam pressure inside the digester. The screw is generally cast from type CF-8M stainless to resist abrasive wear and corrosion from liquor fumes in the digester. When made from carbon steel, feed screws generally require replacement within two or three months.

The tapered throat, subjected to wood acids and abrasive action, is cast from CD-25 stainless. Type CD-25 is a 28% chromium, 5% nickel alloy that has good resistance to the corrosive and erosive action of the chips.

The screw section of the feeder is followed by a short tubular section called a plug tube. Here, chips form a plug that seals off steam pressure from the digester. This unit consists of a flanged CF-8 stainless steel casting, bored and press-fitted with a cast stainless liner of the same material.

An alternative feeding method has been used on many other Asplund Defibrator installations. A rotary feeder (Fig. 6) is sometimes placed between the chip supply hopper and the digester. Each of the pockets of the feeder is filled, and, as the rotor turns, chips are dropped into the digester. The rotary feeder housing and ends are cast from either CF-8 or CF-8M, and weigh about 3 tons.

There are advantages and drawbacks to each scheme. The screw feeder operates with very low steam loss, but because of the chip compression and friction at the throat it requires a high-power, high-torque drive. The rotary feeder runs at modest shaft power expenditure; but with each pocket of chips it delivers to the digester, it delivers a pocket of steam to the steam recovery or venting system. Arrangements are made in the feeder housing to vent each returning hopper.

Exposed to thermal shock from steam and liquor fumes on the digester side and relative coldness on the chip hopper side, the rotor is subject to accelerated corrosion. Abrasion is also a factor, since there must be a fairly tight fit between the rotor and housing to prevent steam from blowing through the feeder. For the most satisfactory service under these conditions, American Defibrator casts the rotor from CF-8 or CF-8M. The liner of the housing, subjected to the constant scouring action of the rotor, needs corrosion resistance too, but the principal requirement is hardness. This unit is centrifugally cast from CD-4MCu stainless alloy.

Type CD-4MCu is a precipitation-hardenable corrosion-resistant stainless alloy recently developed for the Alloy Casting Institute by Ohio State Univ. When hardened to 300 Brinell, this cast steel attains a tensile strength of 140,000 psi, while retaining good ductility and corrosion resistance.

At Hopewell there are two preheaters, each 40 in. in dia. and 30 ft. in length. Cooking time can be varied from 6 to 22 mins. by adjusting the speed of the screws, though normal practice calls for a 15-min. cook at 150 psi. After passing through the second preheater, the pulped chips again fall through a downspout by gravity. They are picked up by a short section of screw that drives them to the end of a closed tube with an orifice at the lower edge of the end wall. An impeller blade wipes this wall, and steam pressure aids in driving the pulp through its orifice into cyclone collectors.

The Asplund defibrator, although not employed in the Hopewell installation, is frequently used for continuous pulping of the cooked chips from the digester tubes. The most recent model employs 33-in. grinding discs and weighs 5 tons. Stainless castings are used for the screw feeder (types CF-8M or CD-25) and the housing (type CF-20).

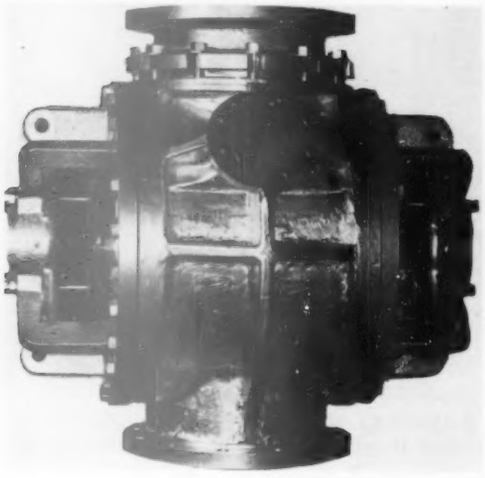


FIG. 6—ROTOR, END AND HOUSING of this Asplund Defibrator rotary feeder utilize stainless steel castings.

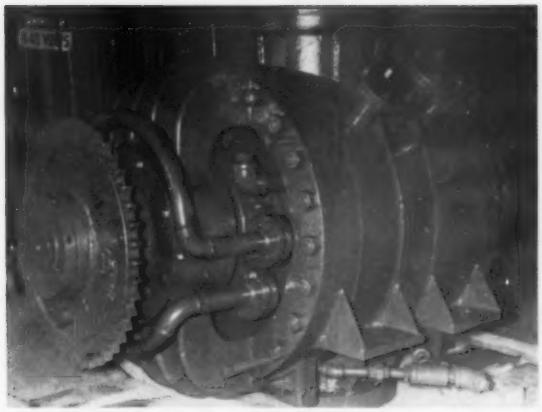


FIG. 7—ROTARY VANE FEEDER USED with Sprout-Waldron digester helps cut steam loss and balance pressures.

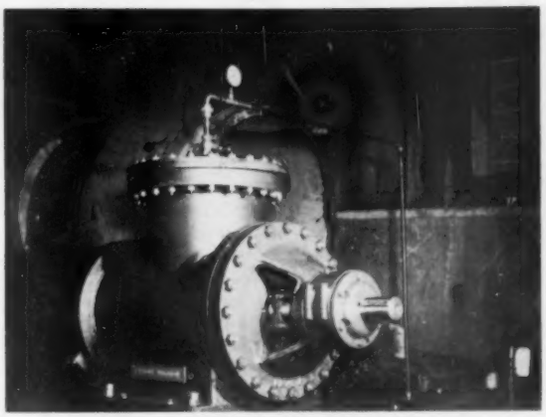


FIG. 8—SCREW DISCHARGER BEING TESTED under pressure. Body and end flange are of cast CF-8M or CF-12M.

For Sprout-Waldron System

Stainless castings are also widely used for digester parts in the horizontal digester design developed by Sprout-Waldron & Co. Inc. The continuous digester is housed in the single horizontal tubular chamber shown in the heading illustration. Actually two independent operating units in one, the digester is divided vertically in half, with each half further subdivided into an upper and lower section. Thus, one-half of the system can be used at a time, or two different woods or chemicals handled simultaneously. The unit operates at 170 psi and is designed to produce semi-chemical pulp within 15 min.

Pre-steamed chips are fed through special rotary valves (Fig. 7)—one for each side of the duplex unit—into the pressure zone of the digester. Valve housings and ends are cast from ACI type CF-8, the general purpose alloy in the corrosion-resistant group. This alloy is chosen for its resistance to sulfur dioxide fumes. Good machinability, also a characteristic of CF-8, is another requirement since the housings are bored and press-fitted with special corrosion-resistant liners.

The valve rotor is cast from CF-8M or CF-8 stainless and must resist erosion by chip abrasive action and corrosive fumes from the digester.

Liquor is supplied to the digester through cast stainless valves and fittings. Liquor is continuously added to the chips, which are moved and turned over by screws as they drop from the first to the second pass. Chips are then conveyed back to the opposite end of the digester.

Cooked pulp next drops through a downspout into a discharger (Fig 8). A separate discharger is used for each operating side of the continuous digester. A screw conveyor moves the pulp to the outlet, where an impeller, wiping an orifice plate, completes pulp discharge to the blow valves. The screws and impeller, which has cast CF-8 vanes, are mounted on a common shaft but can be removed separately for maintenance purposes. The discharger body and its end flange are cast in either CF-8M or CF-12M.

A Sprout-Waldron installation, using these operating principles at Sonoco Products Co., Hartsville, S.C., U.S.A., is designed to produce approximately 400 tons of high-quality 0.009 corrugating board of NSSC pulp, using both sides of the digester.

Suppliers Make News . . .

Hooker Chemical Corp. has moved its corporate headquarters, New York district sales offices and export sales dept. to the 34th floor at 666 Fifth Ave., New York 19, N. Y.; Tel: PLaza 7-9600. . . . *B. F. Goodrich Industrial Products Co.* has named *Trevor Boyce Associates Inc.*, Houston, Texas, to serve pulp and paper mills in the Southwest as applicators of rubber linings for tanks, pipe and fittings. . . . *Southworth Machine Co.*, Portland, Maine, is now in the position of offering completely integrated finishing room equipment lines with its appointment as sales agent for *Hamblett Machine Co.*, Lawrence, Mass., and *Maxson Automatic Machinery Co.*, Westerly, R. I. . . .

The Datamatic div. of *Minneapolis-Honeywell Regulator Co.* has opened a branch sales office in Detroit as part of a program to "expand electronic data processing marketing and service operations in Michigan and adjacent areas." . . . Full-scale testing facilities for chemicals used in pulp and paper, textiles and other applications are now in operation at *Food Machinery & Chemical Corp.'s* Chemical Research & Development Center, Princeton, N. J. . . . According to *Caterpillar Tractor Co.*, guaranteed rebuilt parts assemblies are now available from dealers in the United States and Canada under a "Bonded Buy Parts Assembly" program. . . .

Westinghouse Electric Corp. has divided the engineering and service activities of its Apparatus Products Group "to permit closer integration between company headquarters, manufacturing divisions and regional operations." Manager of industry engineering is P. R. Sprowl; M. B. Wyman is mgr. of service. . . . *Borden Chemical Co.* will construct a Product Development Laboratory and a dry adhesives plant at Springfield, Ore. Project will be coupled with expansion of existing synthetic resin and formaldehyde production. . . . *American Potash & Chemical Corp.* will spend approximately $25,000,000 for capital improvements over the 1960-62 period. . . .

Frank W. Egan & Co., Somerville, N. J., will more than double its principal plant facilities with addition of 38,000 sq. ft. of working space.

How To Eliminate Annular Rings

Study shows slitter runout may be responsible; new type slitter is designed to eliminate this problem.

Annular rings are characterized by concentric rings approximately equally spaced radially, more or less like the similar annular rings of a tree.

Common scapegoats as to causes have been variations in rider roll pressure, variations in web tension, lateral movement of the rewind shaft or winding drums.

The Samuel M. Langston Co. have pinpointed the exact cause of annular rings and placed the blame on the slitters used on the winder or rewinder. The slitters are responsible, their studies showed, if they are of the rotating type, such as shear and score cut.

These studies were made by the Samuel M. Langston Co., in cooperation with two leading paper mills. The principal objective was to eliminate this condition.

The mathematical relationship of the diameter of the annular rings to the slitter diameter was established, and when compensation was made for the speed differential of the slitter to the web, the annular rings were found to be in direct relationship.

When the slitter "runs out" in a plane perpendicular to its axis of rotation, the web actually varies in width, this variation being the same as the amount of "wobble" of the slitter.

The linear distance between points of maximum web width is equal to the slitter circumference corrected for overspeed and determines the base diameter of the annular ring.

The annular ring occurs where areas of maximum paper width are "in phase", falling directly on top of one another during roll build-up.

Thus, annular rings develop gradually rather than abruptly as is the case with offset rings (an entirely different type of ring caused by lateral movement of winding drum, rewind shaft or slitter shaft or abrupt changes in tension).

The first annular ring during roll buildup has one convex area (the wide area) and one concave area (the narrow area). The second ring will have two each of these areas alternately spaced, the third three, etc.

In between the annular rings the various widths are "out of phase" and a relatively straight-sided area is noted. Exactly halfway between annular rings, minor annular rings where areas of maximum width are 180 degrees out of phase can be seen.

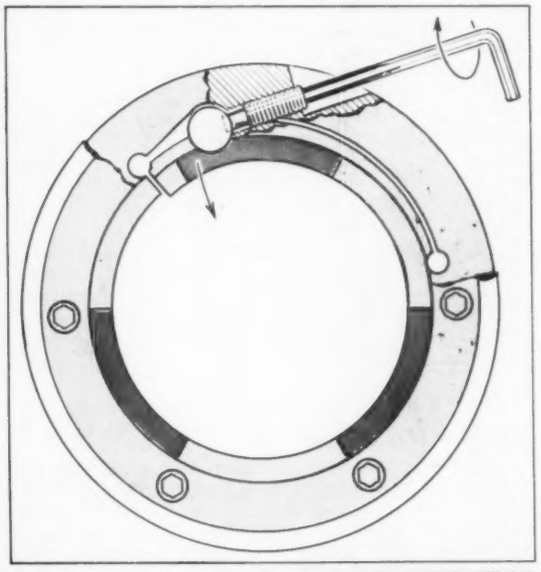
After determining that slitter runout caused this condition, Langston developed a new slitter to eliminate it. The new slitter incorporates several basic improvements on which patent applications have been made. First, the slitter assembly has a wider contact area on the slitter shaft to increase the slitter's stability by producing a better "column ratio", or base to height relationship.

The hubs of the slitter are interlocking to permit narrow cuts. Also, the hub is solid rather than split, thus inherently resisting any distortion that would normally cause a cocked slitter. The gripping action is accomplished by a leaf spring principle.

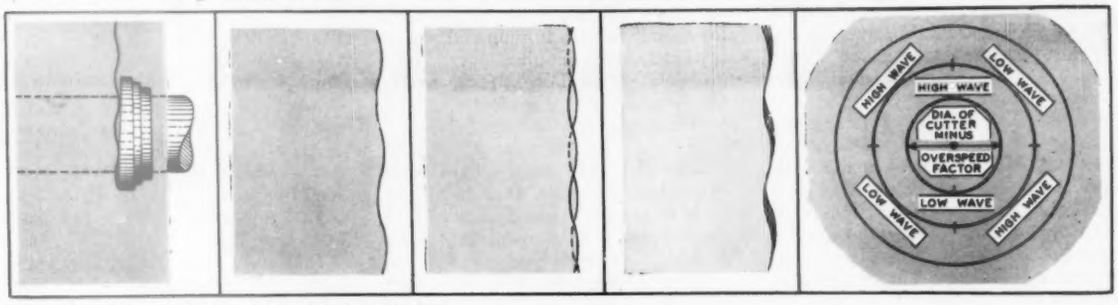
Thus, any hinge effect or distortion from a weak area is avoided.

The spring-leaf, locking action makes it unnecessary to use set screws and gibs against the shaft for holding the slitter assembly in position.

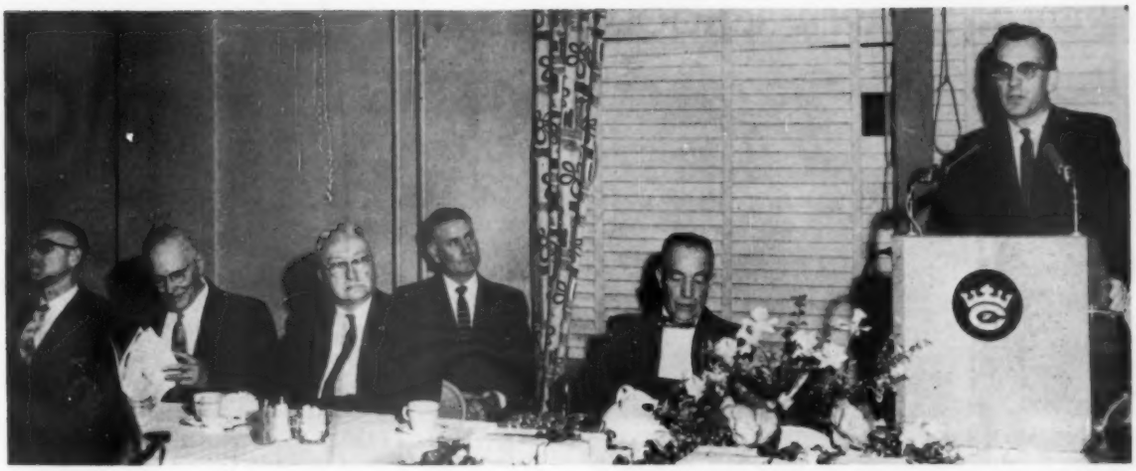
These slitters have proved so successful that Langston guarantees them to run true within .001". They also can be sharpened off the machine, thus minimizing downtime.



NEW SLITTER ASSEMBLY has spring-leaf locking principle which holds slitter to shaft without distortion or runout. No set screws and gibs need be used. Setup changes can be made quickly and easily. Hubs interlock for narrow slitting.



HERE'S HOW ANNULAR RINGS DEVELOP.



McCulloch ..... Grondal ..... Barber ..... McDonald ..... Holbrook ..... Butler

GRADUATES AT CZ's UNIVERSITY-LEVEL SCHOOL hear industry growth predictions. R. A. Butler, res. mgr. of Camas Div. and school regent, points out need for technically trained people to keep pace with industry's developments. Stewart H. Holbrook, author delivered commencement address. C. V. McDonald, office mgr. of Camas Div., and recently appointed director of CZ Paper School, was chairman. Old-timers Dean W. F. McCulloch, School of Forestry at Oreg. State Col., Bror L. Grondal, veteran U. of Wash. forestry professor (now retired), helped bring school program to accredited level. W. R. Barber, formerly CZ technical director, now Camas tech. dept. specialist, participated in founding the school, was it's first vice principal.

Graduating at Crown Z Paper School

Forty full-time employes in 4th year class and 99 in underclasses as school completes 27th year

● The manufacture of pulp and paper products has effectively and significantly enlarged the nation's usable forest resources. This fact, known for years throughout the industry, recently took on broadened acceptability because of having been recognized and acclaimed by a well-known "old time down-East logger."

This capitulation was made by Stewart H. Holbrook in addressing the graduating class of Crown Zellerbach Paper School at Camas, Wash., the school's 27th anniversary.

Mr. Holbrook, who progressed up through the woods-jobs echelon to log scaler before turning forest-lore author several years ago, is renowned for writing books which orient all woods activities in relation to their distance and direction from Bangor, Me. Even to locate points in the state of Washington—which led all other states in quantity of pulp production from 1939 until recently, and everybody in the industry knows there it is—he describes "2,700 miles due west of Bangor, Me., as few if any crows have flown it . . ."

To "pulp and paper outfits" he attributed influences resulting in (1) displacement of the term "lumber industry" in its generic sense and the acceptance of "forest products industry" in its place, (2) switching industry's "hero" role from the "timber beasts" to 'chemists, technicians and engineers", (3) transforming forest management from a visionary park-type program to an industrial practicality.

The industry, in addition to these lasting effects, has made significant contributions to logging, says Mr. Holbrook.

Need For More Knowledge

Addressing the diploma recipients, R. A. Butler, res. mgr. at Crown's Camas div. and regent of the school, predicted a need for "brainpower, imagination, education and training—the like of which the industry has never known before." He called attention to the anticipated growth of paper products consumption: Thirty million more potential customers, by 1970, times the estimated 15-ton lifetime consumption per person. This means lots more paper, important growth opportunities and a real challenge to the industry. "To take advantage of these opportunities Crown Zellerbach is going to need a lot of people with talents and ideas," he stated.

Constant up-dating applies to production as well as to personnel, according to Mr. Butler. The Camas division invested approximately $39 million in machinery and plant development during the past decade "to keep out front in the industry. This year we are spending $6 million plus in improvements to make our products better and our processes more efficient. This is a pattern we will continue.

"Similarly, there must be a constant

CROWN Z PAPER SCHOOL . . .

BIG OCCASION FOR OTIS FAMILY. Malcolm J. Otis (r), who retires next month as res. mgr. of CZ West Linn Div., takes pleasure in presenting 4th yr. diploma to son Edward P. Otis, sls. trainee, Western Waxide Div. Dorothy Otis (Mrs. E. P.) participating as interested observer.

EVEN PHDs ATTEND CZ SCHOOL. Dr. Herman R. Amberg, mgr. plastics research, Central Research Dept., receives parchment from School Regent Malcolm J. Otis, res. mgr. Crown Z West Linn Div. on completing 4 yr. course. This is first time a PhD. completed full course.

upgrading of skills and abilities of the people who make up the rank and file of our company. Our Camas paper school has a most important role to play in this field."

Extending Opportunities

The 40 diplomas presented to members of this year's 4th year class increases to 571 the total number of employes graduating from Crown's paper school since its founding in 1933. During this period 2,000 CZ workers have attended the school for one or more years.

The size of this year's 40-member 4th year class was previously exceeded in size only twice—in 1941-42 and 1956-57, each of these classes graduating 41 students.

Subsequent to the school's modest start at Camas as a mill study group, participation extended to include employes of all Crown plants, offices and subsidiaries within commuting distance. During the past several years students enrolled from the mills at Camas, West Linn, St. Helens, Lebanon; from the woods operations and central research; from offices, divisions and subsidiaries in the Portland area.

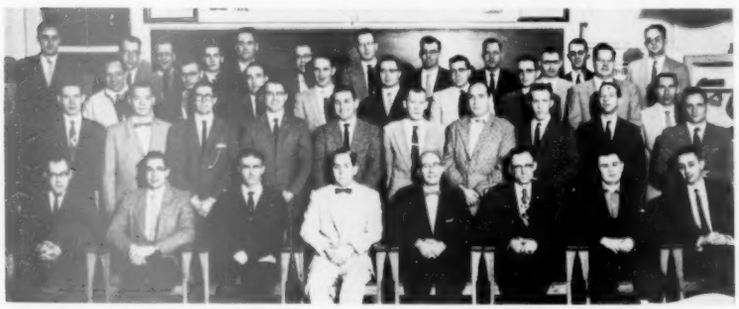
This unique school provides unusual opportunities for the enrolles. In addition to enabling Crown workers —both men and women—to learn more about industry fundamentals and processes, they can obtain college credits leading to a bachelor degree while employed full time. All this by participating in the company's tuition-free school.

Both the Univ. of Washington and Oregon States College have long recognized the quality standards of the CZ school. Students meeting entrance requirements at the college or university can obtain full credit for their paper school participation.

The school has two divisions—general and technical—each of two years duration. Entrance into the technical division (3rd yr. class) is accomplished by satisfactorily completing the 1st and 2nd year classes or by qualifying through experience and education.

The general division is open to both men and women employes. The first year covers operational phases ranging all the way from forestry and logging through sulfite, kraft and groundwood pulp processing, bleaching and quality control. Second-year class studies include production utilities, the making of various types of paper and paper products, printing, maintenance, purchasing, management, etc.

The 3rd and 4th year classes respectively follow in general the 1st and 2nd year subject matter but on a technical, more comprehensive basis.



Fourth-year Graduating Class (l to r)

First Row. Willis W. Oxley, James L. Christensen°, Charles A. Henke°°, Laverne O. Troxel, Hugh P. Loy, Earl Quick, John F. Shank, William P. Gosland, Jr.°°.

Second Row. Edward P. Otis°°°, Robert J. Kennedy, Jr., Victor E. Kreick, Delbert L. Kennedy°, Harold G. Froescher°, Paul R. Williamson°°, K. Paul Wesche, R. Fritz Graff°°, James H. Beck°, Patrick A. Waine°°.

Third Row. Weymouth R. Cook, (Portland Regional office), Charles L. Geiger°, Harold A. Hansen°, Herman R. Amberg, Peter J. Gillas, Jr., Earl E. Egan, John O. Lathrop (Portland Regional office), Floyd E. J. Blair, Terrence L. Girvan, Clayton L. Scott°°°.

Fourth Row. John A. Lindstrom°, George T. Peekema, Terry C. Valo°, William R. Shimmin, Floyd P. Wightman, John F. Beckwith°, James H. Baxter°, Hubert E. Franson°°, Charles H. Hickson, Gene A. Loomas°°°, Charles Galusha°, (Not pictured) Paul Vajda.

°West Linn Div.
°°St. Helens Div.
°°°Western Waxide Div.

FOURTH YEAR HONOR WINNERS. They get week's expense-paid trip visiting Pacific Northwest mills (l to r) Floyd E. J. Blair, Camas, Hubert E. Franson, St. Helens—an honor-award winner in each of his previous three years, James L. Christensen, West Linn, John F. Shank, Camas.

HONOR AWARD WINNERS OF 2nd YEAR CLASS. (l to r) Garnie D. Cone, Portland office, Janeth E. McDonald, Camas, Robert C. Brown, St. Helens. Each received vols. I, II, III of "Pulp & Paper Manufacture."

About one-third of the general division's classes are devoted to mill visits, thus enabling the enrolles to become personally familiar with operations throughout the plant and understand the functional relationship of processes in various departments.

Organizational Set-Up

A board of regents—consisting of R. O. Hunt, Crown Z president, Mr. Butler, and M. J. Otis, res. mgr. of West Linn Div.—provides policy-level direction of the school. Key functional participants include Director C. V. McDonald, office mgr. of CZ Camas Div., Advisor W. M. Hearon, gen. mgr. Chemical Products Div., administrators and assistant administrators. Camas division men participating in these last two capacities include C. W. Davidson, tech. supervisor, J. P. Blaschka, asst. coating-sizing supervisor, R. A. Little, senior engr., M. R. Rivers, gen. supervisor of steam power & operation, W. L. Rich, head bag factory inspector, M. L. Custis, asst. kraft mill supt., F. T. Dowdy, purchasing supervisor, J. L. Stoll, senior industrial engineer.

Each student graduating from this 4-yr. school receives from Crown Zellerbach a copy of "Making Paper," the school's 700-page textbook authored by CZ personnel, and a 2-yr. subscription to PULP & PAPER magazine.

Honor students in the junior class of each division were awarded 2 yr. subscriptions to PULP & PAPER. These winners were: First-year class—Edwin R. Heberlein, Camas instrument dept., Judge R. Dixon, Camas machine shop, Robert E. Willie, West Linn shipping dept., Otis J. Thompson, St. Helens pulp mill; third-year class—James A. Leith, Camas technical dept., Reuben Bafus, Central Research Dept., Donald E. Nicholson, West Linn technical dept., Vernon H. Swanson, West Linn eng. dept.

Full-Time Employees completing requirements at Crown Zellerbach Paper School during past 27 yrs.:

4th yr. class	**571**
3rd yr. class	**734**
2nd yr. class	**1,256**
1st yr. class	**1,968**

Students completing 59-60 classes:

4th yr.	**40**
3rd yr.	**35**
2nd yr.	**25**
1st yr.	**39**

Second-year Class (l to r)

First Row. Mary Nauman***, Helen K. Montag (Portland office), Donald A. Rekdahl, Carl F. Altree.

Second Row. Doyle A. Baer**, Richard F. Enghouse**, Garnie D. Cone (Portland office), Dean L. Vaillancourt (Portland Regional office), Roland T. Fisher (Waterway Terminals Company), Robert L. Griffith.

Third Row. John B. Mason***, Lloyd L. Hogden***, John J. Belecky, Jr.**, Rodney W. Greiling*, Robert W. Conner*, Keith W. Dedmore, Emil L. Zurcher, Michael M. Weber.

Fourth Row. Walter L. Rich (administrator 2nd yr. class), Charles T. DeVoe (administrative asst.), William L. Lewis**, Robert C. Brown**, Kenneth P. McDonald, Francis T. Dowdy (asst. administrator 2nd yr. class), Wilbert W. Walters.

Not pictured. Gordon R. Aune***, Janeth E. McDonald, Hoover C. Peake.

* West Linn Div.
** St. Helens Div.
*** Western Waxide Div.

General Lighting Is On . . .

Combination with supplementary lamps gives good lighting level and reduces brightness contrasts. Tilted general lights provide lighting on vertical surfaces.

General Lighting Is Off . . .

This dryer on West Tacoma mill's postwar Pusey & Jones Fourdrinier machine is PAR-38 lamp-lighted. Closeup view shows how lamps are installed at end of dryer.

Some Developments in Mill Lighting

By DON PHILLIPS*

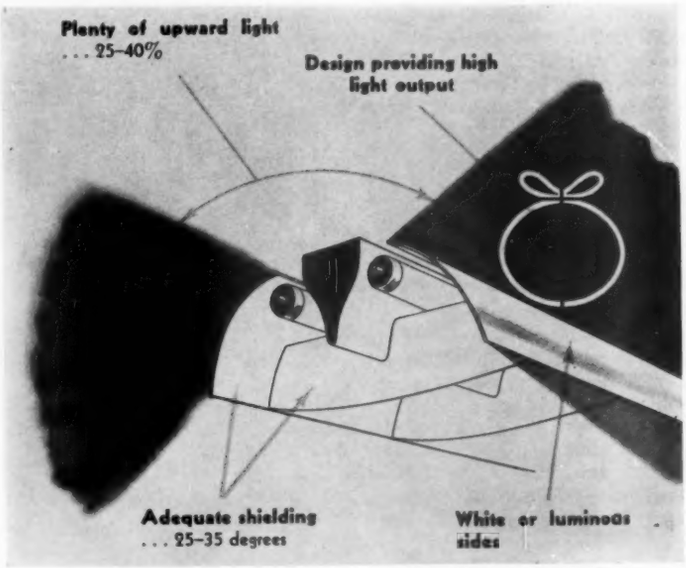
● Lighting problems for pulp and paper mills are basically the same as those of most other industrial plants. Large areas need to be lighted and mounting heights of fixtures are high. But, in addition, the typical operating condition of water vapor in the air must be taken into consideration. The choice of a lighting system depends upon the basic concepts of seeing, i.e. size, brightness contrast, and time.

For the manufacturing area, the general lighting system should not only give a good distribution of light, but shadows should be negligible. These requirements are best fulfilled with the use of fluorescent lamps where the mounting heights do not exceed 25 ft. They are highly efficient with low brightness (for eye comfort) and give good color rendition.

Three New Developments

New developments in industrial fluorescent lighting should be of interest to mills. One is the use of fixtures with openings in the top to allow upward light. See drawing: "Design for Ease of Maintenance and Heavy Service."

In addition to the eye comfort obtained with this type of fixture, it allows ventilation which minimizes dust and dirt accumulation on the reflector surface. In ventilated fixtures, fluorescent lamps operate closer to their designed or rated temperature and thus operate more efficiently.


Plenty of upward light
. . . 25–40%
Design providing high light output
Adequate shielding
. . . 25–35 degrees
White or luminous sides

Design for Ease of Maintenance and Heavy Service

*Illuminating engineer, Lamp Div., General Electric Co., Nela Park, O.

Secondly, a high output fluorescent lamp is now available. It produces approximately 35% more light than the popular 8-ft. slimline lamp and reduces both initial and maintenance costs since fewer lamps and fixtures are needed for a given lighting level.

In the past, there has been some reluctance to use fluorescent lamps in areas which had high humidity, because of the difficulty of starting. This problem has almost been eliminated by the use of a silicone water repellent treatment called "Dri-Film." This treatment reduces the formation of a water film on fluorescent lamps, thereby increasing their ability to start in high humidity areas.

Problem: Reflected Glare . . .

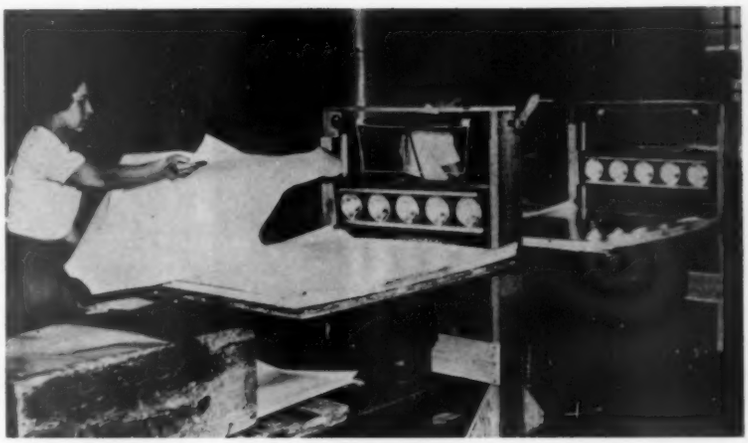
In some areas of paper mills, such as calenders, there is a problem of reflecting glare because of specular material. General lighting systems using fluorescent lamps produce a lower brightness, thus reducing reflected glare and improving eye comfort. Because of the use of large machines, it is important that light be provided on vertical surfaces. Fluorescent systems are particularly good in this respect as they produce a wide distribution of light.

In relatively high bay buildings (over 25 ft.) incandescent or mercury lamps, or a combination of both, are preferred by many owners. This is because the higher brightness of mercury and incandescent lamps enables a given lighting level to be obtained with both fewer and smaller fixtures. As a result, maintenance costs of cleaning and lamp replacement are lowered. On the other hand, more and more high mounting areas are installing fluorescent lamps to take advantage of their high efficiency and low brightness. The use of the high output fluorescent lamp and better maintenance devices make such installations economical.

The heart of a mill is the papermaking or pulp drying machine because the quality of the product is largely determined at this stage of the manufacturing process. Therefore, it is particularly important that the machine be properly lighted. Since there may be a considerable amount of flying water and pulp, which will accelerate dirt accumulation on the lighting equipment, maintenance and the choice of lighting equipment is very important.

Tacoma Mills Find Solution . . .

One very successful solution to this problem was done at the West Tacoma Newsprint Co., Steilacoom, Wash. Lighting between roll of their paper machine dryer section came from bare bulbs at back side of rolls. To improve the lighting, they installed heat-resistant PAR-38 lamps at front side between dryer rolls. Since the reflector is sealed inside the glass, dirt accumulation on the sides doesn't affect light output. Now, operators can see easily and quickly, inspection is more thorough, there is no breakage of lamps, and lost time due to delays in restarting the machines is greatly reduced.



3-Dimension Effect Shows Up Paper Imperfections

Automotive fog lamps are used for inspection of finished sheets. The lamps are particularly suitable because of sharp cut-off above horizontal.

Aid to Color Runs . . .

Color matching is another problem in the paper mill which can best be solved through the use of supplementary lighting. The most accurate representation of color is from a light source which does not emphasize or subdue any portion of the spectrum. The de luxe cool white fluorescent lamp is well adapted to operations where color discrimination rather than accurate matching is desired. When it is necessary to match two samples, however, it is desirable to deliberately distort the appearance of the two samples by lighting them first with a source that is predominantly red and next with one which is predominantly blue. If a color match is obtained under these two sources, then the samples will match under other lighting conditions.

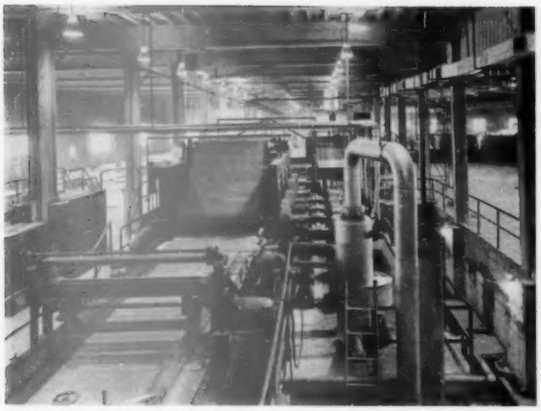
There are a few materials which fluoresce when illuminated by ultraviolet radiation. For this reason, the source which is predominantly blue should also contain enough ultraviolet radiation so these fluorescent effects can be produced. The source which is primarily red should not contain ultraviolet. The daylight fluorescent lamp is a logical choice for the bluish light and the reddish light can be supplied by incandescent lamps.

NEIL F. ROBERTSON, general manager, West Tacoma Newsprint Co., Steilacoom, Wash.—"a very successful solution to problem."

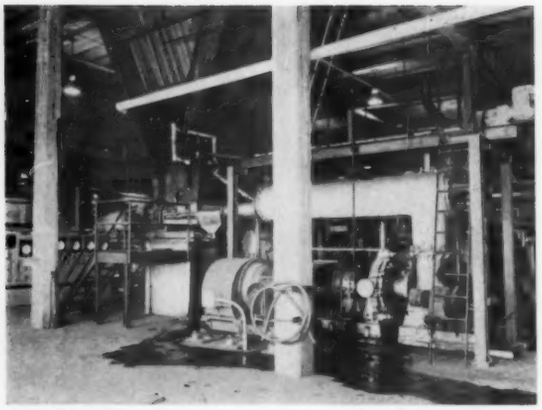
Another inspection problem that often occurs is the examination for small imperfections such as wrinkles, tears, and spots. The use of highly directional sources provides a modeling or three dimensional effect on the small imperfections on the paper surfaces. This is shown in photograph of girls inspecting paper with aid of automotive fog lamps. Shadows cast by irregularities in paper make the detection of defects much easier than with ordinary types of lighting.

From West Tacoma

Neil F. Robertson is gen. mgr. at West Tacoma Newsprint Co., where the pictures of paper machine lighting were taken. C. J. Brown is paper mill supt., Arthur Greaves, plant engineer, and Vince Malin, chief engineer. Mill capacity is 190 tons of newsprint daily.



PRODUCING INSULATING BOARD from straw pulp is this Dominion Engineering machine at the Saskatoon, Sask. mill of Prairie Fibreboard. Unit has been in operation one year. It uses a W. P. Evans & Son Rotabelt.



SOFTENED WOOD CHIPS pass through Asplund Defibrator, first stage of refining at mill that also boasts the distinction of being Canada's first for producing insulating board from straw pulp.

Canadian First: Straw Pulp Board

. . . at Prairie Fibreboard Ltd. Both straw and wood pulping at Saskatchewan mill celebrating first anniversary

By G. D. SINCLAIR* and H. R. SALLANS**

● Canada's original mill for production of insulating board from straw pulp is celebrating its first year of operation with optimism. Prairie Fibreboard Ltd. looks to substantial increase in softboard production "without much difficulty".

Original design output called for a daily 66,000 sq. ft. of ½-in. softboard and 40,000 sq. ft. ¼-in. hardboard. Production includes standard wallboard, asphalt sheathing and roof insulation—plain and asphalt-impregnated—in various thicknesses.

Both insulating and hardboards are produced. Due to possibility of straw shortage during drought years, basic plans were altered to allow use of wood as an alternative. Hardwood and softwood (poplar, jackpine and spruce) are available 70 miles to the north, as well as from farm wood lots. Baled straw is purchased from farmers.

Twin Pulping Operation

Both straw and wood pulping is confined to a two-story section at one end of the mill; stock tanks are on the lower level. Pulp is pumped to either of two Dominion Engineering Co. Ltd. forming machines with press sections —one for insulating, the other for hardboard. Insulating is formed and conveyed directly to the dryer, while hardboard sheets are conveyed to a 20-opening hot press, then through tempering and humidifying chambers. Boards from both lines converge to pass through the same set of dry trim saws. (The two formers are capable of supplying an additional dryer and hot press.)

Straw is discharged from a conveyor into a 12-in. Black-Clawson Hydrapulper. Logs are conveyor-fed to the chipper and chips blown to a cyclone above the vibrating screen. No debarking is necessary since bark left on the chips after chipping, airveying and screening operations is insignificant.

Following defibering and softening straw pulp passes to the semi-pulp chest and diluted to 4-5% consistency; it is pumped through a refiner and discharged either directly into the pulp chest or over the vacuum washer. Rosin is added, after which stock goes through a consistency regulator and neutralizing tower, where alum is added. If required, further Jordan refining is provided.

Wood chips fall into the preheater of the Asplund Defibrator, through the defibrator and discharged to a cyclone. Following a Sprout-Waldron refiner stock dumps into a stock chest Caustic, if necessary, is added at the neutralization tower, followed by a second stock chest, where size is added. Then follow a consistency regulator and acidification tower (where size is precipitated with aluminum sulfate). Stock is stored in the machine chest ready for the former.

(Wastepaper can be loaded into the dry broke Hydrapulper, where it is mixed with broke from trim saws. Asphalt is added here. Two savealls recover fibers from repulped broke.)

Forming Machine Production Lines

The insulating board forming machine has a wire width of 60 in. A

*Formerly managing director, Prairie Fibreboard Ltd.

**Engineering and Process Development, Prairie Regional Laboratory, National Research Council of Canada, Saskatoon, Sask.

short-stroke vibrating puddler breaks up lumps. Excess water removal is by a stationary suction box and a Rotabelt (by W. P. Evans & Son, Clifton, Manchester, England). Four plain bronze presses with top wire comprise the press section.

Following the fourth press, sheet is trimmed and cut into boards and these run in pairs through a six-deck 8-in. direct-fired natural gas dryer. Then to trim saws before packaging and shipping.

Wire Width

Wire width of the hardboard Fourdrinier and press section is also 60 in. It has three instead of four press rolls. The Fourdrinier is the tilting non-cantilevered type with adjustable side deckles. Boards are pushed into platen press openings; hot press is designed to give maximum pressure of 800 psi. Then enter heat tempering chambers and humidifier to trim saws.

A Dominion Bridge Co. Ltd. natural gas-fired boiler supplies 30,000 lbs. per hr. steam at 275 psi.

Principal Suppliers at Saskatoon

Asplund Defibrator. American Defibrator Co. (AB Defibrator, Sweden)
Hydrapulpers: Black-Clawson (Canada) Ltd.
Refiners: Sprout, Waldron & Co. Inc.
Jordan: Black-Clawson (Canada) Ltd.
Forming Machines, Press Sections: Dominion Engineering Co. Ltd.
Rotabelt: W. P. Evans & Son Ltd.
Dryer: Coe Mfg. Co. Ltd.
Chipper: Canadian Sumner Iron Works Ltd.
Heating and Ventilating, Tempering and Humidifying Chambers. Ross Engineering of Canada Ltd.
Boiler: Dominion Bridge Co. Ltd.
Pumps: Canadian Ingersoll-Rand Co.
Vacuum Pumps: Paper Machinery Ltd.
Conveyors: Jeffrey Mfg. Co. Ltd.
Motors: Tamper Ltd.
Engineers: Stadler, Hurter & Co.
General Contractor: W. C. Wells Construction Co. Ltd.

Ten Basic Principles

. . . for Executive Development

● That management development is becoming more and more vital to the success of business is shown in the results of a research program recently completed by General Electric Co. The drastic social-technological revolution of recent years, the report points out, has made the task of managing a business more difficult due to the enormous number of variables that must be taken into account in planning and decision-making.

In his report of research into the field of management development, GE consultant Moorhead Wright has this to say: "The responsibilities of the business manager have been multiplied. Whereas in the early days of the century his obligations were largely economic, there have been added both social and moral aspects to his responsibility. The decentralization and the growth in size of business organizations call for a larger number of competent managers who are capable of making their own decisions instead of 'doing what they are told'."

From the GE study came a mass of data, out of the best of which have been derived ten generalizations. These are contained in a report by Mr. Wright, "How Do People Grow in a Business Organization?", now available from General Electric. The ten basic principles follow:

Principle I—The development process is a highly individual matter. Many manager development plans are needed, each tailor-made to fit the strengths and needs of a particular person.

Principle II—Every man's development in business is self-development. The obligations and responsibilities rest with the individual.

Principle III—The development of people cannot be based on any set of ideal or specified "personality characteristics or traits." There are three things that a manager must know: (1) The product and/or service; (2) the specialized work of the operation, and (3) the common denominator of getting results through other people. The third is the particular work of the manager.

Principle IV—A man's development is 90% the result of his experience in his day-to-day work.

Principle V—Opportunity for development must be universal. Everybody in the company must be given this opportunity.

Promotion Not Emphasized

Principle VI—Primary emphasis must be on development in the present assignment, rather than emphasis on a promotional ladder. There is no attempt here to ignore the importance of promotion as a developmental factor. But, if undue stress is laid on the promotional ladder, everyone begins to feel that he is in his present job only temporarily; that he is on his way up the ladder; that he must devote most of his attention to looking ahead to the next rung, and not to getting his present work done.

Principle VII—Management is a separate and distinct kind of work that is emerging as another profession. We must estimate from sensitive observation of a man's work whether he has demonstrated the desires and capabilities that fit him for the profession of managing.

Principle VIII—Decentralization of decision-making is a prime instrument of development. Organization structure is an important and inherent part of the development process, because it either opens or limits the field for individual decision-learning.

Principle IX—The incumbent line manager at all levels is responsible for the development of people who work under his direction. It is not possible for a manager to delegate the development process to someone else. He must watch the climate that exists; he must make development plans for and with his men; he must originate opportunities and work situations that will challenge and develop these men.

Principle X—Moral and spiritual values are basic in the development process. The quality of our decisions—particularly those in regard to people—must be really good.

Copies of the report are available from Mr. Wright at General Electric Co., Crotonville, Ossining, N. Y.

Synthetics Invade Fourdrinier Wire Field with Start-Up of Huyck Subsidiary

• Introduction of Huyck Corp.'s new synthetic wire (Formex) "will be slow." It is "highly engineered and requires great precision in manufacture."

In a long-awaited announcement, Formex Co.–a Huyck division established nearly a year ago–reports that application engineers now in the field are studying every performance aspect of wires already installed.

This stir in the paper industry has attracted the attention of *Fortune*. From its April issue: "Huyck Corp., with $22,000,000 in sales, thinks it can bring about a revolution in the $12 billion papermaking industry. When Grenville R. Holden became president of Huyck in 1951, he saw that the handwriting on the wall spelled out an inexorably shrinking market. . . . Holden's first move was to develop a second component for papermaking, a synthetic 'forming fabric' that could replace the industry's traditional bronze wire screen."

Perhaps Huyck's move is only part of a worldwide "revolution." Other firms both here and abroad are experimenting in the development of a lightweight synthetic mesh.

Again from *Fortune:* "Holden wondered why the wire could not be replaced by a woven synthetic mesh one-tenth in weight and more flexible and lasting. . . . This idea became the Holden-Schiff patent, after Arthur Schiff in Huyck's felt division developed the specifics.

"Formex is made from a nylon type of synthetic manufactured by du Pont; it comes off the Huyck looms in tube form and is cut off to make an endless woven belt. . . . While Huyck engineers, headed by Charles E. Lee, a former veteran of Kimberly-Clark Corp., are well satisfied with Formex, it still has to pass muster with papermaking engineers."

The new synthetic wire has made its importance felt. Formex is now in production at the plant of Huyck's new division in Greenville, Tenn.

Says the manufacturer: "At least through 1960 the fabric will not be offered for sale generally but will be sold on a limited basis to permit a sound engineering approach and optimal performance for each machine clothed."

Since Formex is manufactured endless, there are no seams. It is claimed to be light in weight and "completely flexible in all directions;" not subject to damage resulting from wrinkling or creasing during installation or shipping; resistant to corrosion in both high and low pH conditions.

Although experimental trials were made on commercial machines in 1957, 1958 and 1959, first orders for Formex were not accepted until February 1960. Some $4,000,000 were spent on development.

The fabric is being manufactured at Greeneville under the supervision of Res. Mgr. J. G. Armstead. Executive offices of this Huyck division are in Knoxville. Formex Co. of Canada is now being organized with G. J. Chalmers of Montreal as gen. mgr.

Sales and Earnings – Year 1959

Representative Pulp and Paper Companies

	Net Sales (000)	Income Bef. Taxes (000)	% of Sales	Net Income (000)	Net Per Share
MARKET PULP (Also Lumber, etc.)					
Brown Co. (11/30)	$ 58,888	$ 944	1.6%	$ 714	$ .27
Georgia Pacific Corp.	191,997	20,341	10.6	14,116	2.58
Puget Sound Pulp & Timber Co.	32,784	9,179	28.0	4,479	1.73
Rayonier, Inc.	129,500	n.a.	—	13,350	2.35
MacMillan & Bloedel (9/30)	183,350	26,565	14.5	13,016	2.44
Weyerhaeuser Co.	458,339	97,807	21.3	60,407	2.00
NORTHERN INTEGRATED COS.					
Abitibi Power & Paper Co., Ltd.	133,813	n.a.	—	11,826	2.72
Diamond National	228,766	n.a.	—	10,286	2.15
Glatfelter Co., P. H.	27,188	5,196	19.1	2,398	3.30
Great Northern Paper Co.	57,737	3,898	6.8	1,848	1.78
Hammermill Paper Co.	61,378	5,913	9.6	3,122	2.44
KVP Sutherland (Pro forma)	121,363	9,657	8.0	4,778	2.15
Oxford Paper Co.	72,500	4,800	6.6	2,290	1.77
Warren Co., S. D.	70,979	10,328	14.6	4,978	4.60
INTEGRATED—NORTH AND SOUTH:					
Champion Paper & Fiber Co. (3/31) (12 mos. ended 12/31/59)	188,518	18,885	10.0	9,590	2.06
Container Corp. of America	322,287	n.a.	—	19,639	1.83
Crown Zellerbach Corp.	527,322	73,329	13.9	39,329	2.76
International Paper Co.	1,030,209	164,155	15.9	83,611	6.21
Kimberly Clark (4/30) A (12 mos. ended 1/31/60)	404,539	63,219	15.6	30,561	3.44
Mead Corp.	323,000	28,500	8.8	13,500	2.66
Riegel Paper Corp.	69,359	5,438	7.8	2,623	1.97
St. Regis Paper Co.	474,000	n.a.	—	28,600	3.00
Scott Paper Co.	297,160	48,005	16.2	24,795	3.08
Union Bag-Camp Paper Corp.	180,800	39,365	21.8	18,965	2.57
West Va. Pulp & Paper Co. (10/31)	233,123	22,477	9.6	11,777	2.21
NON-INTEGRATED PAPER COS.					
American Writing Paper Corp.	15,400	1,323	8.6	641	2.37
CONVERTER					
Dennison Mfg.	43,391	n.a.	—	2,219	3.46

A. Sutherland Paper Co. for year to Dec. 31, and Kalamazoo Veg. Parchment Co. for year to Sept. 30.

n.a.—not available.

The sales and earnings for the year of 1959 were especially prepared for PULP AND PAPER by Cyrus J. Lawrence & Sons, members of New York Stock Exchange, from statistical services and published reports. While the figures are believed to be correct, no guaranty is given as to their accuracy.

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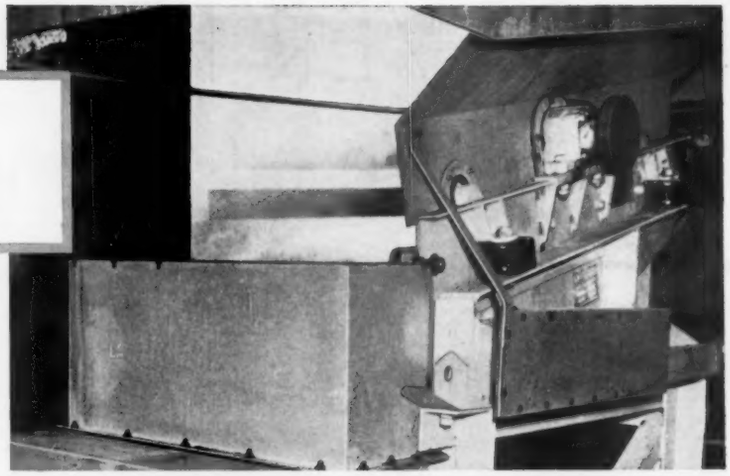

UNION BAG-CAMP PAPER CORP. uses 6 Link-Belt liquid vibrating screens to dewater unwashed and unrefined semi-chemical pulp at its Savannah (Georgia) plant. Each screen consistently processes over 50 tons a day. Dewatering of the neutral sulfite semi-chemical pulp before it is refined cuts horsepower requirements of refiners in half.

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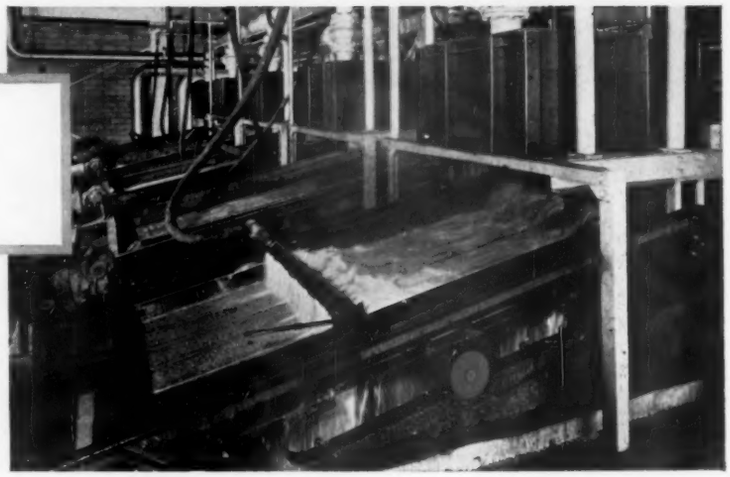

RECLAIMING PULP PARTICLES from large volumes of water is a fast, economical operation with Link-Belt liquid vibrating screens. Five screens at right are recovering pulp from factory white water. Each is equipped with a power-propelled traveling spray. Both dewatered pulp and clarified water are returned to system for re-use.

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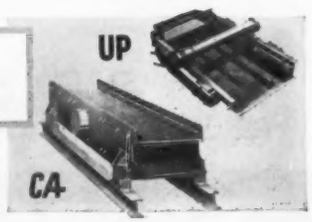

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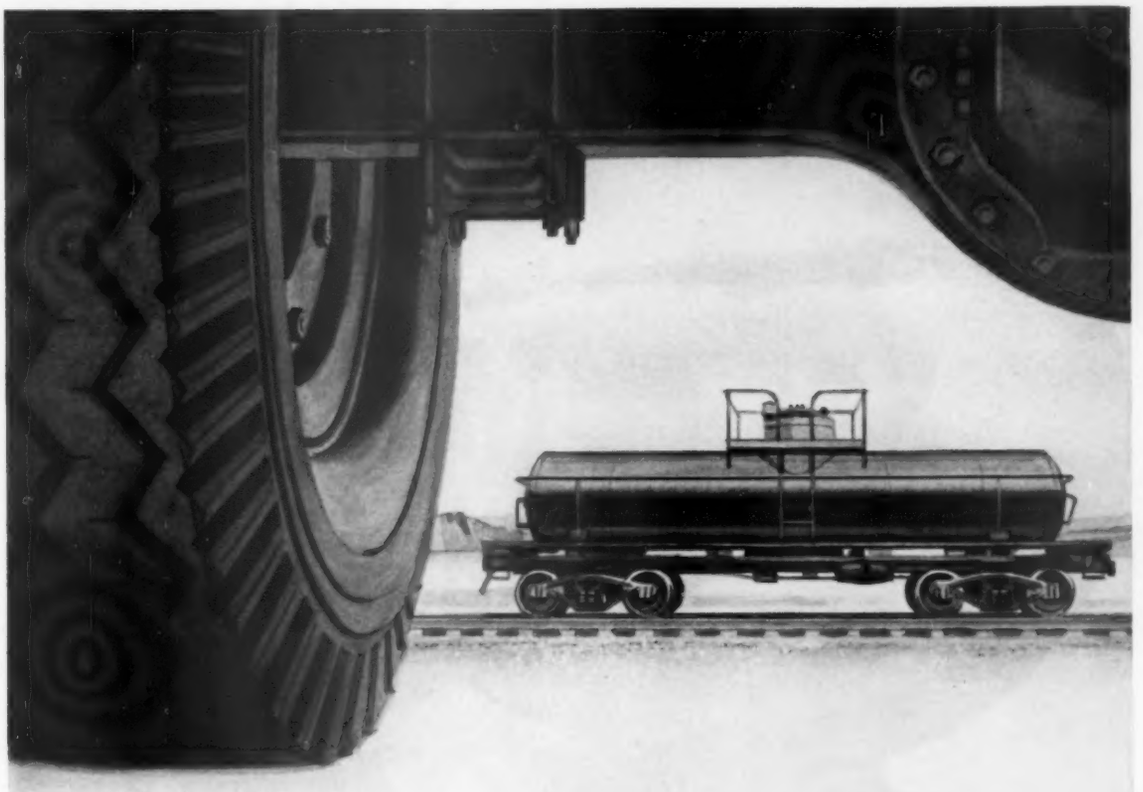

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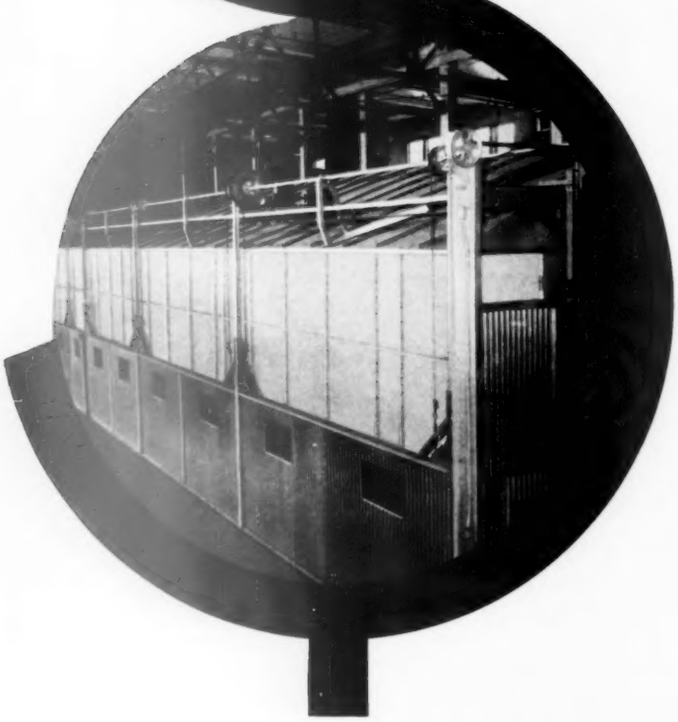

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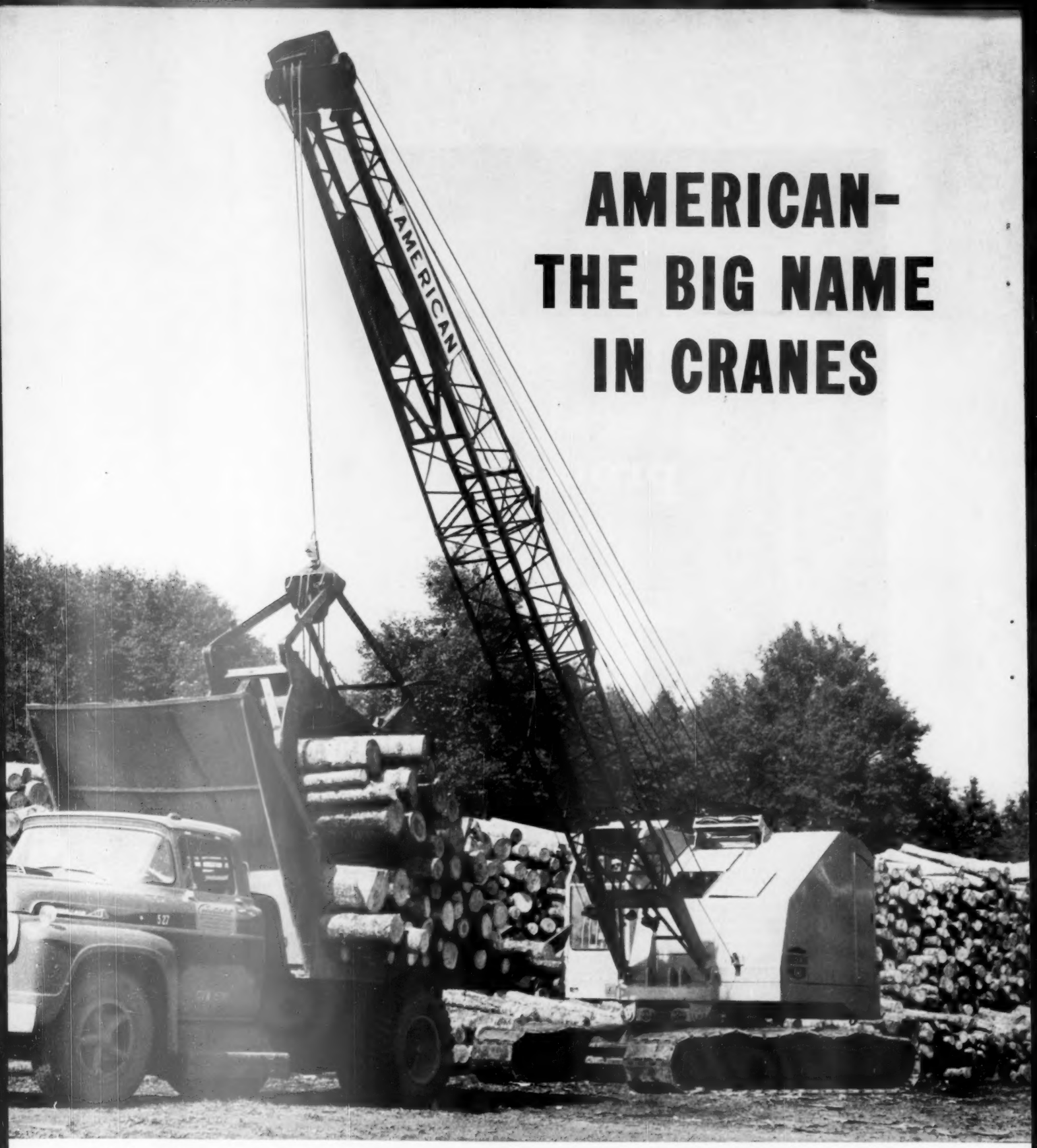

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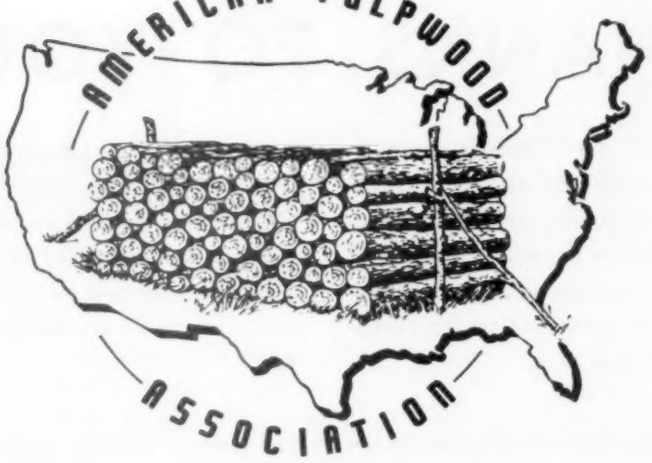
PULPWOOD ANNUAL

1960



Papers Presented at the
Annual Meeting of the American Pulpwood Association

Prepared by American Pulpwood Association
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PULPWOOD ANNUAL—1960

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FOREWORD

Pulpwood consumption increased more than 10% in 1959. As this 1960 PULPWOOD ANNUAL goes to press, this rate continues to an extent that may reflect even greater activity and better business for pulpwood producers and consumers in 1960.

The papers and activities covered by this ANNUAL will do much to help us keep pace with an industry that is certain to progress, and which is on the threshold of another surge in production.

These official papers, presented at the 1960 ANNUAL MEETING of APA, have been edited by PULP & PAPER, a Miller Freeman publication, as in previous years.

We appreciate very much their cooperation in making this ANNUAL available to our members and others interested in the Pulpwood Industry.

W. S. BROMLEY
Executive Secretary

Prepared by AMERICAN PULPWOOD ASSOCIATION
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PULPWOOD ANNUAL SECTION

DEDICATION

D. E. HESS

12th APA President

D. E. Hess, newly elected President of APA, is a native of Pennsylvania, a graduate of the Pennsylvania State University School of Forestry and is active in alumni affairs. For many years he was President of the Penn State Forestry School Alumni Association.

During 11 years employment in the Forestry Division, U.S. Soil Conservation Service, he held several responsible positions—receiving a meritorious achievement award in 1945.

Mr. Hess joined The Glatfelter Pulp Wood Company, a subsidiary of the P. H. Glatfelter Company, Spring Grove, Pennsylvania, in 1946. He is currently Vice President and General Manager.

He was responsible for launching company land management and land acquisition activities and a public relations program that has become widely known. He was instrumental in organizing the Forest Resources Committee of the Pennsylvania Chamber of Commerce.

He has served as chairman of: Keystone Chapter, Soil Conservation Society of America; Allegheny Section, Society of American Foresters; Pennsylvania Tree Farm Committee (5 years); Keep Pennsylvania Green Committee (4 years); Appalachian Technical Committee, APA (2 years).

Mr. Hess held numerous offices and is an active member of state and national organizations, such as: Forest Policy Committee, APPA, Forest Industries Council, Technical Forestry Committee, AFPI, Northeastern Forest Research Advisory Council, National Rivers and Harbors Congress, Pennsylvania Forest Industries Committee, Soil Conservation Society of America, Pennsylvania Forestry Association, Southern Pulpwood Association.

He is active in civic affairs and has served as past president of two local service clubs. Mr. Hess resides in Gettysburg, Pennsylvania, where his office is also located, and where he plays an occasional game of golf at the same club as America's No. 1 citizen. Mr. Hess, referred to as "Hessie" by his many friends, brings to the office of President of APA a congenial personality flavored with a Pennsylvania Dutch mixture of warm humor and practical effectiveness that will serve him and the Association well during his term of office.

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East Texas Pulp and Paper Company
Fibreboard Paper Products Corporation
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Gaylord Container Corporation (Division of Crown Zellerbach Corporation)
Georgia Pacific Paper Company
Green Bay Paper and Pulp Company
Halifax Paper Company Inc
Hudson Pulp and Paper Corporation
Inland Empire Paper Company
International Paper Company
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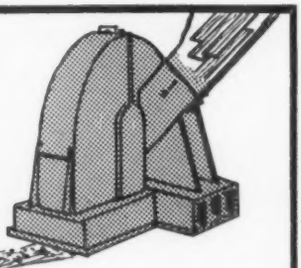

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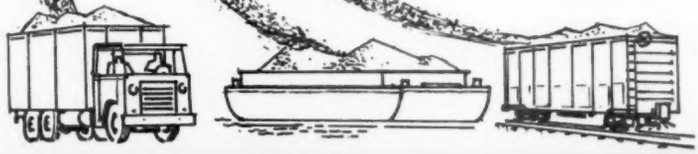

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PARTICIPANTS IN APA SESSION (from left): George B. Amidon, retiring APA president, Minnesota & Ontario Paper Co.; H. J. Wilm, New York State Conservation Dept.; D. E. Hess, new APA president, Glatfelter Pulp Wood Co.; H. E. Ruark, Georgia Forest Research Council; and W. S. Bromley, APA exec. secretary (who gave paper for W. D. Hagenstein).

Multiple Land Use in New York

Legal counsel needed for expansion of 33-4 million acres of public lands beyond present recreational use

By H. J. WILM
Commissioner, Conservation Dept., State of New York

● I am not sure you picked the right person to discuss this particular topic in view of the statutory restrictions which eliminate forest management, in the sense I believe you are using it, on so much of the land under the jurisdiction of the Conservation Department. However, in the time allotted I will at least try to show what we are doing with recreation on the various lands we have.

In this connection I want to refer briefly to the study of our own recreational resources, completed this year, which was undertaken at the special direction of Governor Rockefeller in an effort to measure these resources against the rapidly growing needs and demands of an increasing population with more and more leisure time on its hands. This study, in which we are cooperating with the National Outdoor Recreation Resources Review Commission, headed by Laurance Rockefeller, is the first step in setting up an imaginative long-range program to meet future recreational needs.

Public Lands in New York State

The Conservation Department in New York State is the custodian of about three and a quarter million acres of public land; one-tenth of the land area of the state, and one-fifth of its forest area.

All these lands are open to public recreation, but the opportunity or even the possibility for coordinating forest management with recreational uses depends on their legal and administrative status. For instance, we can eliminate the 200,000 acres or so of state parks, which include such well known spots as Bear Mountain, Allegany and Letchworth, all intensively managed for recreation and with no forest management entering the picture to any degree.

Then we have some 106,000 acres of game management areas including wetlands, quite well distributed around the state. While these have wildlife management as their chief objective, an active program of timber cutting is carried on with the help of the forestry technicians, both as an income producing enterprise and in the interest of good game habitat.

A still larger group of lands consists of the nearly 600,000 acres of State Reforestation Areas, acquired throughout the farming districts of the state. This acreage is made up of 372 tracts which vary in size from the statutory minimum of 500 acres up to aggregates of some 15,000 acres, where two or more purchase units have coalesced.

The stated objectives of this program when it got under way in 1929 were the retirement of submarginal land from agriculture, reforestation and timber production in that order of importance. The last two decades have seen a shift in emphasis toward recreational use, first as their value for public hunting grounds became known in the localities, and later as the demand for other forms of recreation led to the installation of simple picnicking facilities, impoundments

PUBLIC CAMPSITE on Macomb Reservation near Plattsburg, N.Y., is a State Reforestation Area, where recreation and forest management go hand in hand.

and eventually a full-fledged public campsite which is under construction in Chenango County. The labor for this significant project is furnished by the Pharsalia Youth Rehabilitation Camp.

On these reforestation areas generally we are now shaping up a multiple-use program in which sawlog forestry, wildlife management and public recreational facilities will each have their appropriate place.

Administration of Forest Preserve

The administration of forest lands in the categories I have just enumerated is relatively simple compared to what we are confronted with on the bulk of the lands under our jurisdiction, namely, the two and one-half million acres of the Forest Preserve in the Adirondacks and the Catskills.

Here we cannot determine our management or recreational policies wholly in accordance with public demands or our best administrative judgment, but must work within a comparatively rigid framework laid down by the Constitutional Amendment of 1894 with its prohibition against cutting timber, and the succession of legal opinions and court decisions that have stemmed from it.

Every step that we or our predecessors have taken that involved any cutting of trees has required advice from the Department of Law and in some cases legislative action or a test in the courts. On such a basis we have erected fire towers, built trails, telephone lines and access roads, thinned plantations, developed public campsites, cut deer browse, and entered into an intensive program for timber salvage on the Forest Preserve after the 1950 Blowdown.

We have likewise under legal guidance conducted programs of insect and disease control, one of which involved a sanitation cutting in mature balsam. Through recent amendments to the Constitution, it has been made possible to straighten or relocate highways in the Forest Preserve and to dispose of so-called "detached parcels" of Forest Preserve lands outside the boundaries of the Adirondack and Catskill Parks—which, incidently, are not "Parks" in the conventional sense, but merely the legal delineation of areas within which, half a century or more ago, the lawmakers thought it would be nice to *have* a park. Thus, within the "Adirondack Park" more than 60% of the land is in private ownership, including the holdings of most of the larger forest industries, in the state, more or less intermingled with the State-owned tracts.

Relation to Private Lands

This rather anomalous pattern of ownership makes it necessary, in talking about recreation and forest management in the Adirondack Park, to consider not just the State Forest Preserve lands, but more properly, these lands in their relationship to the private lands—and particularly, the company lands—with which they are bound up, "for better or for worse."

Notwithstanding the desire that some groups or individuals might have felt in the past for the State to acquire as much of the land as possible within the Adirondack and Catskill Parks, the fact remains that the public is well served in some ways through the presence of private forest land in these regions. By this, I don't mean to imply that a program of further acquisition to the Forest Preserve isn't needed, for there still remain many parcels which the State should acquire for consolidation, better access and for particular scenic, recreational or watershed protection values.

As an example of how private lands may serve a particular need most effectively, I may cite the improvement in deer feeding grounds that results from logging. It is likewise true that where undisturbed Forest Preserve abuts land which has been lumbered there exists an ideal combination of food and shelter. The deer situation is important because deer hunting comprises so important an element in their recreational use. More than 100,000 deer hunters are abroad in the Forest Preserve counties of the Adirondacks every year, and there are at least 60,000 in the Catskills.

The extent to which the private lands are available to the general public for hunting depends on the policy of the owner. I know that some companies feel that leasing produces a good income from their lands, particularly those which have been cut over and those not producing an income from timber at the present time. On the other hand, I was interested to see signs on some company lands in the Adirondacks last fall that said "Welcome Hunters," or similar words.

We have also heard quite a lot recently about the possibility of a zoning arrangement on some of the industry holdings. It is not for me to say, of course, whether one policy or another is the better. Each company has its own problems, fiscal, silvicultural and of public relations, on the basis of which they will arrive at the decisions best for them

However, it might be worth pointing out, as a technical consideration, that restricted hunting may prove to be silviculturally hazardous if the resulting overpopulation of deer leads, as it can, to the liquidation of the seedling reproduction. This is going to become increasingly important, I think, as the trend toward hardwood utilization continues in the pulpwood industry.

Developing Recreational Possibilities

Forest industries here in the Northeast are becoming more and more interested in developing other recreational possibilities, such as camping and picnicking on their lands, as is already being done successfully in the West. This is good public relations and good public service.

In this respect the forest industries are in pretty much the same boat as the public agencies, in that more and more of the public with more and more time on its hands is demanding more and more of the country's wild lands for their recreation.

Incidentally, most of the people who travel through the Adirondack Park or other mountainous terrain by car have little idea as to whether they are passing through public or private forest lands. It is all wild country to them and they feel they have a proprietary interest in it.

The fact that an area has been logged doesn't make much impression, unless it's of so recent vintage that the area looks denuded and the logging debris is still in evidence. A few years later, when sapling or pole growth has reoccupied the area, it begins to look like wild land again. As an example, there is a place near Speculator, known to most New York foresters, where you can stand on the line between State land and company land cut 40 or 50 years ago, and have trouble telling which is which.

Forestry-Recreational Conflicts

On the contrary, if logging operations are actually in progress where the public is passing through, and especially if these operations are so located that they foul up a well known hiking trail or impinge on the beauty and solitude of an area that has remained undisturbed for a good many years, those who use these trails or who have an attachment to some of these spots are immediately up-in-arms and, not knowing enough about industrial ownership patterns to realize in the popular phrase "who done it," they usually make their complaints to us, feeling that whatever disturbs the wilderness anywhere in the Adirondack Park is the State's business (even though it quite clearly isn't).

I just mention these situations to call attention to problems that are bound to arise wherever the economics of forestry and wild land recreation come in conflict.

A partial solution to this problem of multiple use is to establish recreational routes and camp spots away from logging operations and, conversely, to avoid insofar as possible operations on sites having high quality scenic or recreational values.

This, as most of you know, has been achieved with some degree of success on public forests, both state and national, and is no doubt being taken into consideration by the industries wherever they are planning to embark on a program involving recreational use of their lands.

Wilderness Area "Management"

To some it may appear rather pointless to talk about "forest management" as related to an area like the Forest Preserve, where management, in the orthodox sense, can't be practiced at all. But, as I have indicated earlier, and as Dean Vaux of the University of California School of Forestry pointed out in a recent issue of *American Forests*, even "wilderness areas" require their own form of management if their recreation potential is to be fully utilized. Wilderness types of recreation must necessarily comprise a major segment of the administration of the Forest Preserve where, according to a preliminary report of the Joint Legislative Committee on Natural Resources, we have a number of roadless areas of from 15,000 to 50,000 acres and some considerably larger. It is here that we have the majority of our hiking trails, our leantos and our opportunities for relatively complete solitude.

In contrast are what might be called the "semi-wilderness" recreational facilities—the chain of public campsites, which can and do accommodate more than a million persons a year, along the main highways which traverse the Adirondacks and Catskills, passing through many parcels of Forest Preserve land. Here, also, we have ski centers and a few parks of the conventional type such as at Lake George Beach. Thus, we cover a wide spectrum of recreational management with which we must combine such features as forest fire control, forest pest control, and, in emergencies such as the 1950 Blowdown, timber salvage.

I feel sure you will agree that to fully meet our responsibilities for protecting and preserving these lands under constitutional edict, and still try to meet the demands of the public is a difficult but at the same time a stimulating and rewarding task.

NEW YORK FOREST PRESERVE provides public campsite on Lake Eaton.

Photo—N.Y. State Conservation Dept.

Fires Losses Can Be Averted

Forest management coordinated with fire control and fire research is needed to protect investments in forest lands

By H. E. RUARK
Director
Georgia Forest Research Council

TWENTY-FIVE OR MORE TONS PER ACRE of high flammable fuels may accumulate in the lower coastal plain following protection.

● Approximately ten years ago, three young men of my acquaintaince started a business of manufacturing and selling a line of aluminum products. The business has made phenomenal growth during the decade. Two of the partners handle the buying, designing and manufacturing, while the third is responsible for sales. The success that this business enjoys can be attributed, in part, to the well coordinated efforts of all branches of the company. Consequently they are able to sell quality products cheaper, and, as long as they continue to do so, they will always find the consumer's door open to them.

I tell this, not because you are particularly interested in the selling of aluminum products, but to illustrate that any business that has products to sell, must give its salesman every advantage if he is to outsell his competitor. This applies not only to aluminum products but also to paper products with which we are concerned. Fortunately for my young friends, they are not involved with the process of procuring raw materials and manufacturing aluminum. Their supply is ordered according to specifications and is delivered to them by railway car.

I might add, at this point, that I have been surprised at the number of key people in the pulp and paper industry whose thinking does not go beyond the delivery of wood to the mill. Yet it is you who must plan and sweat to get quality wood to your plant as cheaply as possible. When you do, you will have done your part towards giving your salesmen an advantage over their competitors.

It is this area with which I am concerned. I can only touch on coordinating forest management with fire control and fire research. The ability to meet the demands of supply quality wood at reasonable cost involves much much more than is thought by those who believe that your basic raw materials come from a railway car.

Your problems probably start with a tree breeding program and extend beyond the harvest to the unloading of the railway car at the mill. Through out this long, and not always easy program of tree breeding-to-harvest, you have hanging over your head the possibility of a wild fire that could destroy many years of effort in a matter of hours.

Should this happen, your salesmen will be at a distinct disadvantage with their competitors. You know that your company, no matter how much land it owns, cannot afford a heavy fire loss. Let us then consider how a loss may be averted by careful planning in advance and coordinating not only forest management, but all activities with a fire control program.

Defining Fire Control

It would be well to, first, define fire control so that we may get a clear picture of our subject. Fire control is an all-inclusive term dealing with the protection of forests from fire. It includes prevention, presuppression, detection and suppression.

Fire prevention encompasses all of the activities directed toward reducing the number of fires. Among these are the various media used to educate the public, law enforcement, and hazard reduction.

Presuppression concerns itself with the activities performed in advance of fire occurrence to insure effective suppression action. It includes recruiting and training, planning the organization, maintaining fire control improvements and the procuring of equipment and supplies.

Detection is self explanatory and deals with the act or system of discovering and locating fires; while suppression includes all the work of confining and extinguishing a fire after it is located.

History teaches us that most forested sections of the country have, at one time or another, been subjected to large blow-up fires. It then stands to reason that these same forests can burn again under the right combination of conditions. Now, what are these conditions? They are: (1) suitable weather; (2) available fuel; and (3) a match or some other ignition agent.

Fortunately, we have better knowledge of weather than ever before, and we are in position, in our forest management planning, to better regulate

forest fuels. However, even though we know a little more about weather and are attempting to regulate our fuels and our forest conditions, the fact remains that the more forest products being grown per acre, the greater will be the amounts of inflammable material present.

Moreover, we must always be alert and not allow ourselves to be lulled into feeling that big fires cannot and will not occur again. They can, and one should never forget it. Consequently, we should take steps, now, to insure that fires will not occur; but, if they should, loss will be held to a minimum.

Fire Control Planning

This then leads to another question: Have you reviewed the fire control planning in your company within the past twelve months? Fire control planning is as important to a forest landowner as accounting, cutting budgets or any other phase of the business of growing trees. With the many changes in personnel, equipment and conditions it is necessary to appraise the fire fighting organization from top to bottom periodically.

When you evaluate your fire control organization, you will probably spend considerable time reviewing fire prevention accomplishments and fire prevention needs. You might ask yourself this question: Does the manager of my company's land have a written fire prevention plan, so that all within his organization know the goals we are trying to achieve, and understands those actions which will lead to those goals?

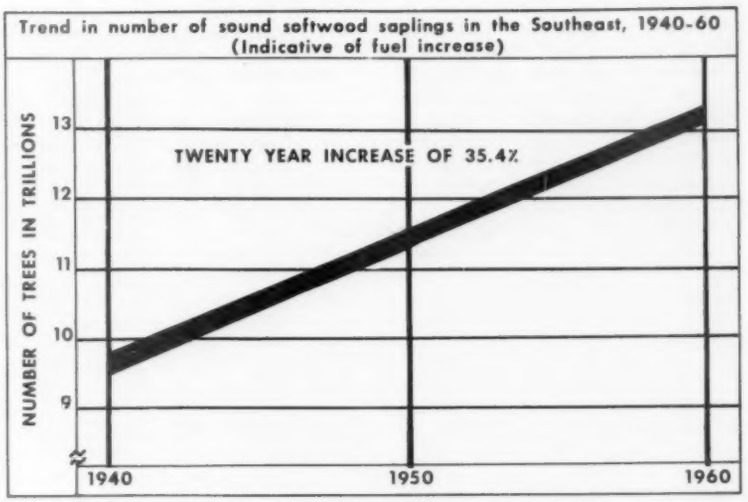
Remember, we are speaking of live, raw materials for your mill; of growing timber stands valued up in the millions of dollars to many individual companies. The cost of producing your company's products will increase in proportion to the damage your raw materials trees suffer from wildfires. Should this occur, your salesmen, whom we spoke of earlier, will be placed at a disadvantage in that his competitor may be in a position to under quote him.

Fire prevention is the responsibility of everyone who benefits from the forests. You realize if you have an investment in the forest, your responsibility is much greater than those who happen to live in the community where your lands are located, or have only an indirect interest in them.

Community Relations Program

A genuine community relations program will go a long way in reducing the number of fires. Like charity, this program must start at home. First, your company must live as a good neighbor in fact. Second, all employes must feel a keen sense of responsibility towards the prevention of forest fires.

Local get-togethers, such as barbecues, fish fries, picnics, etc., cause company employes and local people to have a better understanding of each other and each other's problems. These get-togethers provide for an interchange of ideas and suggestions.



Fire Fighting Program

The prevention of fires is an essential part of any fire control program. It is as equally important to have a fire control organization trained and in readiness to combat fires when they occur. I shall not attempt to recommend the type or kind of fire organization needed for any area. Every section of the country has different laws and possibly different means of supporting the fire organization.

For example, all of the fire fighting activities may be entirely under state control, or the organization may be a combination of state and industry; still, in another area, state, industry and other organizations may combine their resources to combat forest fires. It matters not, however, who or the number of organizations represented. The major concern should be that there is a strong, well trained corps of fire fighters, subject to call on all fires.

In most cases public agencies are responsible for only maintaining a minimum level of protection. If their funds are low, and there is little public interest in the fire control program, this level may be inadequate for the area. It might be well to determine the level of protection in the areas where you are responsible for land. It may be that you can assist in raising the level of fire protection in the area commensurate with the values at stake.

Business men today are advised that they should become more active in political and civic affairs. There is a definite need for more interest from business leaders in building and maintaining an adequate fire control program. In many cases, the public fire control program is under-financed because no one took the time and effort to lend a helping hand. It may be too late if we wait until the winds are high and the fuel is dry before showing concern. A topnotch fire fighting organization cannot be built overnight. Selecting, training and equipping personnel are the first steps toward developing a good fire organization.

Good Coordination A Necessity

The well coordinated use of manpower and equipment, under an agreed upon single leadership and attack plan, is essential in a fire suppression action. Only through prior agreement, planning and training can an effective coordinated effort be made. Many states are charged by law with the responsibility of fire protection. These states should take the lead in planning and training for the coordination of fire fighting resources.

If no action has been taken in this direction in areas where you control land, it behooves you to give this matter your personal attention. Millions of acres of charred timber in America today are evidence of failure, on someone's part, to coordinate the resources of concerned landowners on going fires.

One of the most important phases of fire control is organizational plan-

ning. Yet it is something people are not too concerned about while the woods are wet and other work is pressing. Everyone in your day-by-day fire organization, and any others who may be assigned a part under emergency conditions, should know where he fits into the organization and be trained in the jobs he may be called on to perform.

An alert forest land managing organization will keep its people classified and rated so that the most competent man can be readily placed into each key position of the fire organization.

In considering your fire organization, or that of others, it might be well to keep these points in mind. As fire prevention activities become more successful, it follows there will be fewer fires to fight. With fewer fires, fire control men have less opportunity to work and practice with fire. In time, this lack of experience and practice lowers the organization's effectiveness. The use of fire, as a tool of timber land management and protection (prescribed burning), provides frequent and valuable training in the understanding of fire behavior.

"Prescribed Burning"

Fire, when controlled and intelligently applied, is a useful and economical tool for a land manager in many areas. Prescribed burning, under appropriate conditions, is inexpensive and effective in getting certain land management jobs done. All too often, prescribed burning is not used because of a lack of knowledge and appreciation of what fire can do when it is properly prescribed and applied. There have been examples where sentimentality or old inhibitions have been allowed to obscure the dollar-and-cents business advantages to be gained from a scientific use of fire.

Other Useful Practices

Let us consider other land management practices which can be used to strengthen and better organize our fire control program. A network of roads is vital to growing, protecting and harvesting timber. An efficiently designed network of roads gives maximum access to forest land and is invaluable in fire control work. Conversely, a road which makes an area accessible to fire fighting equipment can change surface hydrology which may increase the fire hazard.

Draining of an area will also change the water table and may thereby be responsible for a change in stand composition and consequently the nature and quantity of its fuel.

The amount of fuel in a stand can be increased or decreased according to silvicultural treatments. Cuttings may remove part of the fuel weight, yet will put slash on the ground which in turn increases the fire hazard.

Site preparation, for planting, gives the forest manager an opportunity to greatly reduce the fire hazard on the ground. When he does this, he may be creating large areas of even-age stands which in future years will become susceptible to crown fires under certain conditions. Therefore, he should plan his area age classes so as to minimize fire losses.

Accurate, detailed maps and aerial photographs are most important to the fire control organization. A sufficient number of current maps should always be on hand Please do not let someone change George Herbert's proverb, "For want of a nail the shoe is lost, for want of a shoe the horse is lost, etc." to "For want of a map the forest is lost."

I once saw a sales slogan which said, "From the Tree to the Finished Product." I wish, for your land manager, that his job was that simple—from the tree to the finished product. Instead, his work and responsibilities extend over a period of twenty or more years—from the tree breeding program to the merchantable tree. During these years, he is constantly adjusting his land management practices to obtain the maximum growth on each acre of land. He is, at the same time, aware that forest fires can destroy all in one blow. Consequently he and his men are always striving to prevent forest fires. Should this fail, they are equipped, organized, trained and in readiness to take immediate suppression action.

Forest Fire Laboratories

Your land manager, and your salesmen too, will be glad to know there is an expanded forest fire research program underway to reduce fire losses in America. The world's first major forest fire laboratory was officially opened in Macon, Ga., in November 1959. Research at the lab is made possible through a joint undertaking between the U.S. Forest Service and the Georgia Forest Research Council. Funds for the construction of the lab were provided by the Research Council. Funds for the construction of the lab were provided by the Research Council, and the Forest Service is conducting the research with their staff and equipment.

A second lab is reaching completion at Missoula, Mont. A third is planned for California. Research at these three labs will be coordinated to give the maximum returns from the program.

Fire scientists will seek to learn more about natural laws that affect fire in the woods, and why fire responds in certain ways to weather and natural fuels. They will conduct basic research on principles relating to ignition and combustion of forest fuels, heat transfer, radiation and convection, fuel properties, and the physics and chemistry of extinguishing forest fires. They hope to develop new concepts of fire control that will be of use in the South and elsewhere.

SOUTHERN FOREST FIRE LABORATORY houses wind tunnel, fluid modeling room, controlled humidity and temperature chambers, combustion chamber, well equipped chemistry and physics labs, darkroom, offices and conference rooms.

FORESTRY WOULD BE PROHIBITED on this national forest area in Washington State if wilderness bill were enacted.

Wilderness Bill Favors a Few

Proposed law would stifle economy in some regions—wilderness areas are needed, but question is where and how much

By W. D. HAGENSTEIN
Executive Vice President
Industrial Forestry Assn.

● If anyone had told any American audience interested in land management five years ago that Congress would give serious consideration to a proposal to establish a blanket wilderness system of more than 50 million acres of largely unexplored, uninventoried and unmanaged Western federal lands, you would have laughed loudly.

It is no laughing matter. There is a serious drive by a small dedicated minority who believe that a law must be enacted to "protect" a significant portion of Western federal lands for roadless wilderness. They would prohibit management of these single-use areas and threaten management of adjacent multiple-use areas.

Strangely, the proponents of this idea are mostly intelligent professional and business men, college professors, and articulate editorial writers of several nationally known newspapers. None of them apparently realize—or if they do, they choose to ignore it—that the basic wealth of our country comes from the land. Nor do they realize or care that by prohibiting multiple use of millions of acres that belong to all the people they are mortgaging their own standard of living and their children's.

It is significant that support for a blanket wilderness system has come mostly from urban areas and not from people close to the land who know where our basic wealth originates. With our nation's population expected to exceed 300 million in 40 years it is clear that single use of productive land can only be followed where it can be proved that it will not adversely affect society.

It is not surprising to note among the proponents a great many familiar names. During the thirties, they were among those who would have forced forestry on private lands by federal law, parceled our whole country into river valley authorities, increased federal landownership, put the government into every natural resource business and decreed federal control of our entire economy. They include New Dealers of both major parties, so at least the battle is non-partisan!

One can't but wonder if the years of federal propaganda against the forest industry haven't come home to roost in the wilderness proposal. Many federal employes who propagandized against private forestry during the thirties and even through World War II spent so much time playing footsie with the so-called conservation organizations that they allowed the conservation movement, which was originated by the pioneers of our profession in the Forest Service, to be taken over by those who seem to have other motives than assuring the greatest good for the greatest number in the long run.

Bill Due to "Political Expediency"

Political expediency has called the tune in present endorsement by both federal land management departments of the fantastic wilderness scheme which consigns the future of hundreds of Western communities down the rat hole.

In frank personal discussion with many federal foresters on the wilderness question, expediency has frequently been given as the reason for locking up far too much commercial forest land in the wilderness areas now established under regulation by the Secretary of Agriculture. They don't and can't say that publicly, but these are professional men and they have their professional viewpoints. Some of us have to run the risk of political tarring and feathering to make known our views against this senseless wilderness proposal.

The proponents have neither justified their bill on the basis of need, knowledge, nor emergency except by the politically-proven tactic of emotional crusading. They are dedicated to "saving 2% of America that now remains in its virgin condition for the enjoyment of future generations as permanent wilderness." Not one in a hundred of the proponents who have beseeched Congress to pass their bill have any conception of what 2% of the land area of the United States means, nor do they realize, because federal landownership occupies more than half of the West, that they're talking about foreclosing forever the development and management of more than 15% of all federal lands in three Western states and significant percentages in all others.

It is surprising to me, even in the weakness of political expediency, that the Department of Agriculture would endorse the wilderness bill when it is so obvious that if it were enacted, the next step of the proponents will be another bill to transfer that portion of the wilderness system in the national forests to the National Park Service. Once that happens, the big city newspapers' drive for single use of 50 million acres of America will have been successful. And their editorial writers can sit smugly in their comfortable offices and not know that they have completely destroped the future of Western boys and girls yet unborn by reducing their opportunities for a good living.

Other Proposals Being Made

Of course, the single users aren't just content to have all their eggs in one basket, so now there's talk of a new million acre national park in Oregon, a bill calling for study of the national-park potential of a million and a half acres in the state of Washington, a bill to create a Great Basin National Park in Nevada, talk of a bill to convert the Salmon River country of Idaho into a national park, and a lot more in the offing.

These proposals are emanating from the same organizations which are trying to steal the conservation movement away from the Forest Service. Needless to say, if any of the proposals go through, the new national parks will be created out of what is now, for the most part, multiple-use national forests.

Appeal of "Wilderness" Areas

The idea of establishing wilderness areas, to be kept forever roadless, for the enjoyment of people who will take the time and have the energy to use them, is intriguing. Every red-blooded American yearns for the old West where men were men and when there were darned few women out that-a-way.

Television has firmly established the myth that the West was settled by swashbucklers whose prime attributes were the fast draw, a big capacity for redeye and little regard for law, land, or moral women. This national calumny on our Western Pioneers is a crime against history because the fact is that those who followed Horace Greeley's advice were mostly people who wanted to locate and develop land for a permanent economy. Most of them, like most Americans, came from the landless classes of Europe. Their urge to own land was the paramount reason for risking losing their scalps, dying of thirst or starvation, or walking themselves to death crossing the Western plains.

Of course, the idea of wilderness on federal lands isn't new. It was originated by the Forest Service 35 years ago when the Secretary of Agriculture established the first wilderness area in New Mexico. Since then, there have been nearly 14 million acres set aside for exclusive use of wilderness travelers.

Pose Fire Protection Problem

All these roadless areas constitute an important protection problem to adioining multiple-use lands, regardless of ownership. Obviously, the only way to attack and suppress fire in roadless areas is by foot or horseback or the expensive and often dangerous use of smokejumpers. The difficulties of reaching a fire in time with enough men and equipment to prevent it from becoming large points up the risk of conflagration.

One such devastating fire occurred in a roadless area in 1958 in Glacier National Park, Mont. Of course, single users will say that this is nature's way, but in my opinion, accessibility would allow better management of scenic resources by protecting them from destruction. The wilderness bill will not allow adequate protection of many inaccessible forest areas in our national parks.

Insect Infestation

Protecting roadless wilderness against insects is another serious problem. There is no use spending large sums controlling insects on multiple-use areas only to have uncontrolled wilderness areas serve as focal points for reinfestation of the treated areas.

A good example of this is the widespread infestation throughout the Rocky Mountains of the Englemann spruce beetle. The only way to control this beetle is to remove the logs from the woods when the broods are in them or by spraying standing trees from the ground. Obviously, neither method can be used to control an infestation in a roadless wilderness.

There are many portions of our national parks which are wilderness areas because no roads have been built through them. The wilderness bill obviously has the intent of keeping most of these areas in that condition. This will have the adverse effect of limiting park management of scenic resources by keeping them inaccessible and making it more difficult to protect them from fire and insects.

If you think I'm reading something into the bill as to the intent of the proponents in not caring whether scenic resources be preserved for public enjoyment, let me cite a strange but interesting case. One energetic national park superintendent who formerly managed a park in the Northwest did his best to act as a judicious recreational land manager by attempting to control an insect infestation by removing infested material from the woods. Because he was alleged to have "ruined" the park scenery by its protection against insects, he was transferred across the country because, some say, of the political representations made to his superiors by proponents of the wilderness bill. They apparently don't realize, that even for single use, land must be protected and managed if the public is to reap its benefits.

I'd like to say that I am a wilderness enthusiast. Like most Western foresters, I believe there's a real place for it. The only question is where and how much. To dedicate, willy-nilly, millions of acres of land to wilderness before they are adequately studied to determine their highest uses to society, cannot be justified under either multiple- or single-use concepts.

Use Studies Should Be Made

Multiple use, currently being derided by advocates of the wilderness bill, is most certainly adapted to most of our land. It is essential if we are to provide the increased employment and outdoor recreation opportunities our growing population demands.

Therefore, it is wholly reasonable, in opposing enactment of blanket wilderness legislation, to ask that Congress positively require that before any federal area be dedicated to any kind of management—multiple use for forests, minerals, forage, water or accessible recreation, or for single use for recreation in roadless wilderness—that appropriate studies be made and a finding rendered based on the facts.

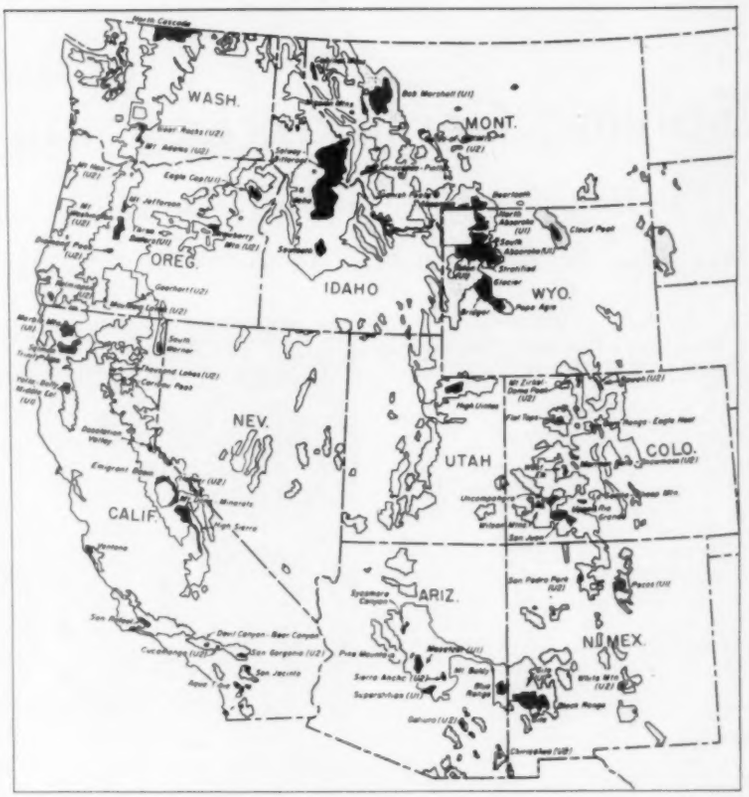
It was absence of such a study in the case of the 900 thousand acre Olympic National Park which took one third of a million acres of superlative timber-growing land out of a national forest and has kept it in roadless condition since, so that neither the purpose of a national forest nor national park has been fulfilled.

Actually, nature has set aside a tremendous area of the West as wilderness. It is mostly lands inside national forests and national parks, including high mountains above timberline, alpine forests, meadows and lakes. Except in a few areas where mineralization is evident or where there is need for summer range, upland water development, highways, or transmission lines, most of these lands —upwards of 25 million acres—were set aside as permanent wilderness by the Deity. No act of Congress, nor any other human ordinance, could change them one iota.

But that's not enough for the proponents. They want to march down the mountainsides to take in whole forested valleys and to preclude their management under multiple use. They are opposed to the "commercial" interests. I wonder whether they think we, whom they call commercial, would be so engaged if we didn't fulfill important human needs.

What the proponents of the wilderness bill basically want is either a blanket wilderness system or to put the members of Congress under the gun on each individual wilderness area on a purely emotional basis. This departs from every sound tenet of land-management policy.

Why not allow our federal land agencies to dedicate certain areas as wilderness, after studies have demonstrated that their highest use to society is for that single use? After all, the recreational resource, be it wildlife, pure scenery, wilderness, picnic areas, campgrounds, winter sports areas, summer sports areas, or otherwise, must be managed.



WILDERNESS-TYPE AREAS in the National Forests in western U. S. are indicated in this map by black areas.

Simply dedicating an area by establishing a boundary around it and calling it a wilderness, whether by regulation of the Secretary of Agriculture, a practice of the national park service because it has not built any roads, or by Act of Congress, isn't enough. Land whose highest use to society is for wilderness should be managed for that purpose by administrators who have the professional elbow room to make decisions based on local conditions.

No "Wilderness Bill" Foreseen

Personally, I don't believe Congress is going to enact a wilderness bill at this or any future session for a number of reasons.

First, no case has been or can be made for the legislation.

Second, the proponents have unwittingly opened up the whole subject of wilderness reservations already made and have thus invited closer public and Congressional scrutiny of all present single-use dedications.

Third, the opposition of informed natural resource industries of the West and the people who work in them constitute a much larger number of voters than the membership of the organizations sponsoring the bill.

Fourth, Congress has too much sense to weaken our economy in any way by reducing our natural resource base when it fully knows that our enemies are dedicated to the proposition that food and materials are much more important in the struggle for world domination than fun.

Solving Complex Logging Problems

. . . in large-scale operations by application of Operations Research techniques, with primary use of mathematical tools

By L. J. LUSSIER
Operations Research Director
Quebec North Shore Paper Co.

OPERATIONS RESEARCH helps gauge efficiency of operations such as tree-length skidding shown here.

• The purpose of this paper is to show briefly the application of Operations Research (OR) techniques to the solution of complex logging problems. The presentation is essentially practical and is illustrated by examples drawn up from logging operations of northeastern Canada where OR methods have been extensively applied during the last five years.

As most of you probably know, Canadian logging operations are carried out by large companies which must invest huge sums of money in acquiring raw material, and in using the necessary productive agents to bring this raw material to their mills. Problems raised by large operations differ considerably from the ones ordinarily found in small operations. As wood harvesting in the U. S. is characterized by operations of 12 men or less, it may be that some of the examples given do not apply too well to the problems met in the U. S. Nevertheless I hope that you will be able to see some useful relationship.

Management of large scale logging operations is a very complex function. Difficulties arise from a set of factors which must be well understood if the usefulness of OR is to be fully appreciated.

Four Major Problems

Major problems encountered by the woods manager can be grouped under four categories:

1. Prediction and Control Problems caused by the diversity of factors involved and widespread operations.

Woods activities are characterized by a large number of variables, some of which are outside the control of the manager. The logging fact is therefore difficult to measure and predictions are often upset by the occurrence of some unpredictable events. Furthermore, woods operations are spread out over a large area and are performed in continuously changing work conditions. Production control is thus difficult to obtain.

2. Planning problems raised by technological developments.

As a result of technological developments, alternatives of production have increased tremendously, and the woods manager cannot rely upon experience alone to determine the work conditions that suit best each of these new alternatives. Accurate information on the interrelation of factors of production and planning methods to combine production agents in the best possible manner are necessary for sound administration of logging operations.

On the other hand, development of new research tools and techniques upsets completely conventional approaches to planning problems. High speed electronic computers, for example, make possible the solution of problems which could not be tackled ten years ago on account of the great amount of time required to reach the answer. Thus, situations where judgment has always been the only basis for decision-taking can now be submitted to systematic analysis. This is a major advancement in the science of management.

3. Organization and information problems caused by poor organizational structure and improper definition of environmental conditions, production units, time units, and cost elements.

Efficiency of industrial activities cannot be reached without (1) having members of the organization accurately informed of the various phases of the enterprise, and (2) having an adequate mechanism through which information flows smoothly, and within which members of the enterprise work efficiently together.

Experience has shown that organizational structure of logging departments is often inadequate for the needs of the modern woods manager and that information on which decisions are taken is very poor. There are no standardized measures of effectiveness, work environments are loosely described, definitions of time, production, and cost elements are as numerous as there are individuals in the organization, and so on. Obviously, this situation may lead to wrong managerial decisions.

4. Personnel problems raised by the adaptation of personnel to new techniques, methods, tools, and machines.

The problem of adapting personnel to new work methods, techniques, and machines is a very serious one and is actually faced by the industry. Dif-

ficulties come mainly from the instability of forest workers and lack of basic education of some members of the supervisory staff. There is a gap between machines and techniques actually available and technical know-how of logging personnel, and this gap is getting wider and wider as the above personnel problems remain unsolved. Greater labor stability and more intensive training programs are necessary conditions to progress.

Now that the main problems of the woods manager have been briefly examined let us see how operations research can contribute to their solution.

General considerations on OR

OR can be defined as a group of techniques whose objective is to optimize the combination of production agents that make up an industrial organization. It borrows its techniques from a large number of sciences, but the main one is mathematics. Very often, though, the OR technician must refer to the science of economics, cost accounting, sociology, physics, chemistry, etc., depending upon the nature of the problem.

Obviously, it is not possible to be specialist in all these sciences and I like to stress the fact that OR is essentially team work. However the OR technician must have the ability to coordinate the knowledge of each member of the team in a way that the solution found will be an optimum for the organization as a whole.

One major objective of OR is to avoid as much as possible suboptimum solutions, that is solutions optimizing decisions in only one specific department of the organization. A suboptimum solution may be very undesirable if considered in the overall context of the enterprise. The main reason is that departments often have conflicting objectives.

Consider for example the attitude of the various departments of a logging enterprise towards the optimum size of logging camps. Finance department may be opposed to large camps because they require too much capital investment. Production department may feel that large camps are economical in the long run because they reduce overhead costs per unit of product. Personnel department might be opposed to big camps because they do not favor workers' family life. Stores department may favor large camps because inventory control is made easier, and so on.

Camp size thus affects the objectives of each department and the policy most favorable to one department may be unfavorable to the others. An OR solution to this problem will consist in finding a size of camp that is an optimum for the organization as a whole.

Measurement of logging facts

Accurate measurement of logging phenomena form the basis of sound managerial decisions. Without reliable information on production and costs the sophisticated techniques of OR are useless and their application is a waste of time and money, and may lead to wrong decisions.

1. Production standards can be defined as precise measurements of given production systems such as wood cutting, timber skidding, etc. These standards have very important economic implications and are mainly used for production planning, production control, cost budgeting, establishment of piece rates, and labor negotiations.

Observations that are used to set up standards are usually obtained by two methods, namely continuous timing and snap-shot observation (known as ratio-delay, or work sampling method). The latter method is particularly useful for the analysis of delays.

Many difficulties are encountered when setting up logging standards, most of them resulting from the very large number of factors involved, and the lack of normality of time distributions. However these difficulties are not insurmountable and experience has shown that accurate standards can be set up at low cost in a relatively short period of time.

The establishment of standards requires a good statistical background but, on the other hand, it cannot be successfully achieved without a long experience and a thorough knowledge of the observed production system.

Work standards may be expressed by simple linear equations or by more complex polynomials such as: $y = 1.14T^{.96} + 1.24TC^{.5} + .03Td + .39D + .13$ which estimates the production of a feller buncher yarder machine known as the VFB.

y = min./round trip for felling, bunching, yarding
T = trees/load
C = trees cut/acre
d = average diameter of trees cut, inches
D = average skidding distance, 100 ft. units

This model applies to the following conditions:

$$T = a \text{ for } a < 18$$

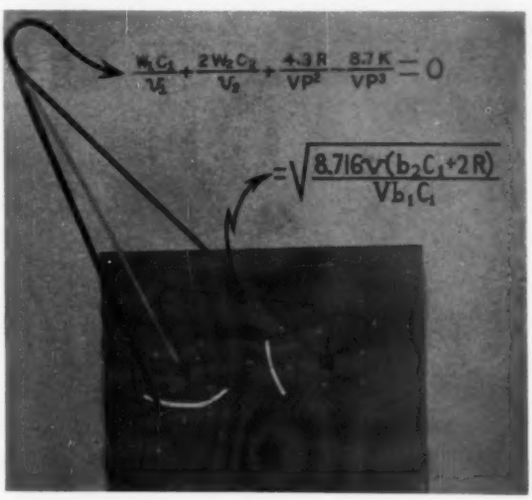
where a = trees/cord
$T = 18$ for $a \geqslant 18$
$4'' < d < 12''$, slope $< +15\%$

Skidding road permitting an average speed of 7 mph.

Information obtained from equations similar to the one mentioned above may be finally presented in a tabular or graphical form.

2. Cost standards. Generally speaking a cost standard is simply a standard quantity of the production agent necessary to perform a certain task by the unit cost of using this agent. Therefore one part of the problem of establishing cost standards is essentially the same as the one of determining production standards, or more generally quantity standards.

As far as material and labor are concerned the determination of unit prices presents no problem as they are usually fixed by the manufacturer or specified in the collective bargaining. However, machine unit cost is



PRODUCTION PLANNING with Mathematical model

not as easily determined.

Some cost components such as capital recovery, maintenance and repair, and machine unavailability, are difficult to appraise. Furthermore, time units measuring the cost per unit of time satisfactorily differ between cost elements. In order to prepare a satisfactory rate it is first necessary to compute each cost component on the basis of its proper time unit, and then reduce each one of them to the same unit by the use of appropriate conversion factors.

Several methods have been suggested for appraising machine rates but most of them do not seem to consider the main difficulties involved. The result is that machine rates are generally subjective and may lead to poor production planning, cost budgeting, and decision-making.

Machinery replacement

The greatest difficulty encountered when preparing a machine rate is to determine capital recovery cost. This can be done only through the use of a sound replacement policy. A replacement policy will provide some means to:

(a) Obtain the economic life of a piece of equipment.

(b) Minimize unit cost of production.

(c) Discriminate between various types of equipment that can perform the same task.

(d) Avoid any bias or arbitrary judgment in favor or against a given machine.

(e) Obtain the best estimate of the operating cost of logging equipment.

The cost function of an HDW tractor would be:

$$C = \frac{7000 - R + \int_0^T (.0093t)dt}{T}$$

where

7000 = Purchasing cost
R = Salvage value at time T
T = Life of machine
$.0093t$ = Repair cost as a function of time (per hour)

The economic life is found as follows:

$$\int_0^T (.0093t)\,dt = \left[.00465\,t^2\right]_0^T = .00465\,T^2$$

$$C = \frac{7000 - R + .00465\,T^2}{T}$$

$$dC/dt = 0 = \frac{.00465\,T^2 - 7000 + R}{T^2}$$

$$T = \pm\sqrt{\frac{7000 - R}{.00465}}$$

Production planning

Once reliable production and cost standards are available for various sets of working conditions it is possible to plan the operations in an optimum manner, that is to find the combination of productive agents that yields the minimum cost per unit of products. Various methods can be used for this purpose, among which are the following:

1. Mathematical model, direct solution. This is the most popular approach to production planning and it consists in grouping under one equation the most important factors of the problem and finding by differentiation process the values of the factors that minimize or maximize a certain variable such as cost or production. This approach was used by Prof. Mathews in his book "Cost Control in the Logging Industry" but he avoided the use of calculus to simplify his presentation. However, such a simplification may sometimes be a source of error.

Road spacing problem of Mathews (p. 121) would be solved by calculus as follows:

Skidding cost/cord $= C^S/4$
where C = variable skidding cost, cents/cord 100′
S = spacing in 100′ units

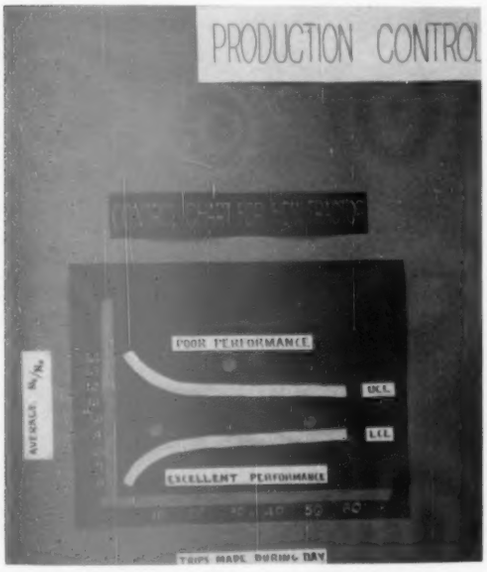
Road cost $= R/12.1VS$
where R = road cost in $/mile
V = cords/acre

Total cost $= y = C^S/4 + R/12.1VS$

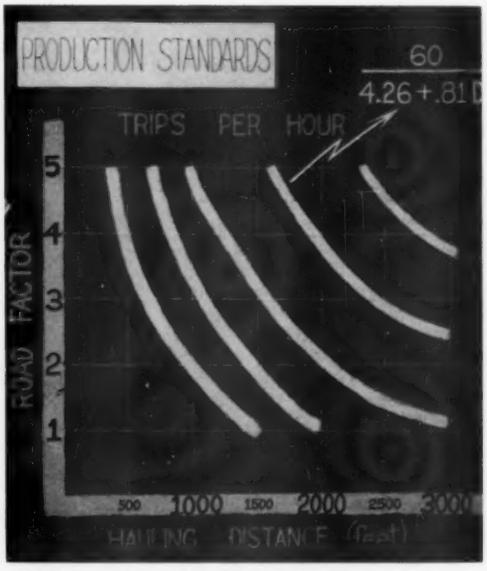
$$dy/dS = C/4 - \frac{R}{12.1VS^2}$$

$$S = \sqrt{\frac{.33R}{VC}}$$

2. Mathematical model with successive trials. The main disadvantage of using a mathematical model lies in



PRODUCTION CONTROL chart for HDW tractor.



PRODUCTION STANDARDS for HDW (4-ft wood).

the difficulty to include in it those factors that are not repetitive or cannot be numerically expressed. There may be a tendency to neglect some important variables and thus depart significantly from reality.

One way to overcome the lack of flexibility of mathematical equations is to use them only as a means to get a first approximation of the desired answer. The best solution is then reached by successive trials, taking into account the various restrictions of the problem.

Equations used to determine the optimum processing landing locations on a full tree operation using the Bombardier Processing Unit:

$$\frac{.8W_1c_1}{v_1} + \frac{2W_2c_2}{v_2} - \frac{4.3R}{VS^2} - \frac{8.7K}{VS^3} = 0$$

where

W_1 = average speed of skidder (min./100')
W_2 = average speed of truck (min./100')
c_1 = operating cost of skidder ($/min.)
c_2 = operating cost of truck ($/min.)
v_1 = average load of skidder (cords)
v_2 = average load of truck (cords)
R = truck road cost ($/100')
S = optimum maximum skidding distance to slasher (unit of 100')
V = volume per acre (cords)
K = cost of moving slasher ($)

It is outside the scope of this paper to explain the derivation of the above equation. A detailed description ot this trial and error approach has been already submitted to CPPA for publication.

Once S is known, the first approximation to the optimum number of slasher locations is found by:

$$N = \frac{4.3A}{S^2}$$

where A = Total area in acres

The number of trials may vary from N − 2 to N + 2. The number of slasher locations yielding the minimum cost is then chosen.

3. Problems involving inequations. Problems that were already discussed could be solved by minimizing or maximizing a certain function, or solving a system of simultaneous equations. However, some problems cannot be described by equations, but rather by inequations. These inequations result from restrictive conditions that are placed upon the problem. We say for example that the production capacity of a machine is not greater than a certain number of units, that the quality of a product should not be less than certain specifications, the length of the operations should not be more than a given number of days, and so on. Restrictions such as these are very frequent in the study of industrial problems and a special method known as Linear Programming must be used to handle them.

Numerous logging problems could be solved through LP, among which are machine scheduling, wood purchasing and transportation, shipment of finished products, and so on. Unfortunately, time does not permit further discusssion of this important technique.

Production control

Once production is planned in an optimum manner necessary steps to insure that plans are properly carried out must be taken. Production standards will be used as goals to which actual production will be periodically compared for the purpose of measuring operational efficiency and detecting unfavorable causes. Control limits on each side of the standard will be placed as follows:

Let N_E = Estimated production
N_O = Actual production
$Z = N_O/N_E$ = variable to control

Now we may write:

$$N_O = N_E + \epsilon$$

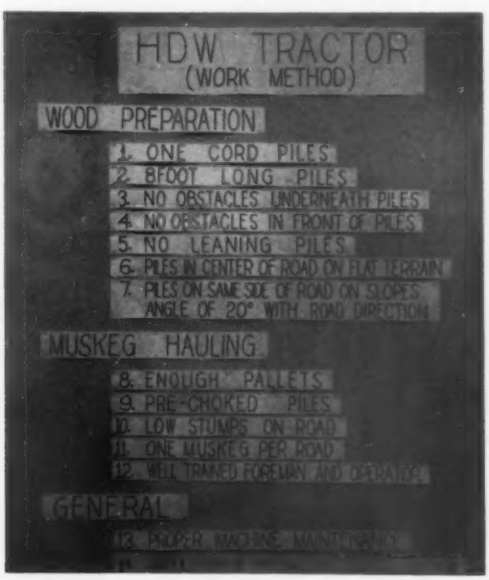
Where:

ϵ is the deviation of the observed time from the estimated one. If tables of standard data are unbiased, ϵ should be zero on the average.

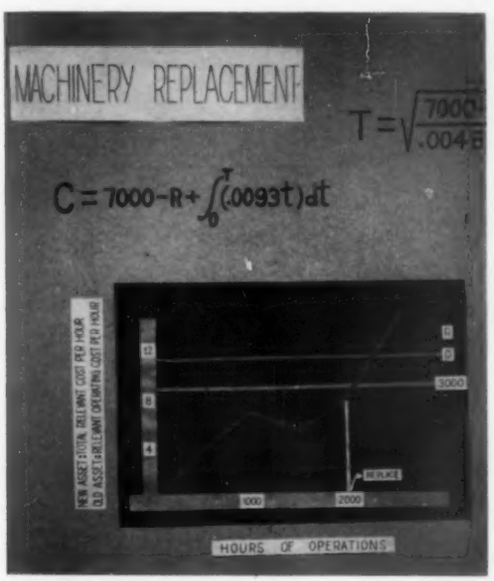
Therefore:

$$Z = \frac{N_E + \epsilon}{N_E} = 1 + \frac{\epsilon}{N_E}$$

The term ϵ/T_E is zero on the average such that variable z is independent and has expected value *one*.


HDW TRACTOR
(WORK METHOD)
WOOD PREPARATION
1. ONE CORD PILES
2. 8FOOT LONG PILES
3. NO OBSTACLES UNDERNEATH PILES
4. NO OBSTACLES IN FRONT OF PILES
5. NO LEANING PILES
6. PILES IN CENTER OF ROAD ON FLAT TERRAIN
7. PILES ON SAME SIDE OF ROAD ON SLOPES ANGLE OF 20° WITH ROAD DIRECTION
MUSKEG HAULING
8. ENOUGH PALLETS
9. PRE-CHOKED PILES
10. LOW STUMPS ON ROAD
11. ONE MUSKEG PER ROAD
12. WELL TRAINED FOREMAN AND OPERATORS
GENERAL
13. PROPER MACHINE MAINTENANCE

DEVELOPMENT WORK and work method analysis.



MACHINERY REPLACEMENT chart for HDW.

The sample variance is given by

$$\hat{\sigma}_Z^2 = \frac{\Sigma(Z_i - \overline{Z})^2}{n-1}$$

and the control limits that will be used for production control are given by:

$$UCL = \overline{Z} + t\hat{\sigma}_Z/\sqrt{n}$$

$$LCL = \overline{Z} - t\hat{\sigma}_Z/\sqrt{n}$$

where

n = number of observations on which control is based
t = distance of deviations from mean term of σ

Inventory problems

Stock inventory such as material and supplies for logging operations, replacement parts for machinery, wood in mill yard, etc. is always a heavy burden for large logging enterprises. It is therefore important to derive some methods that will minimize the costs associated with inventory.

Inventory control has been studied in detail by various operations research technicians and many good books are available on the subject. Some inventory models are very simple, (fixed demand), whereas some others are extremely complex (random demand), depending upon the nature of the problem.

Where the demand is fixed and known:

1. Procurement cost

$P = YS/Q$ = Total procurement cost for period T
Y = Expected demand for the commodity over period T
S = Procurement cost for each order
Q = Order size

2. Carrying charges

$$X = \frac{QCK}{2}$$

$Q/2$ = Average inventory level over period T
C = Unit cost of commodity at destination
K = Carrying charges in % of unit cost C

3. Total inventory cost (1 + 2)

$$I = YS/Q + QCK/2$$
$$dI/dQ = YS/Q^2 - CK/2 = 0$$
$$\therefore\ Q = \sqrt{\frac{2YS}{CK}}$$

Development work and work analysis

One of the main objectives of an OR department in logging is to follow the development of new machinery such as the BPU or the VFB, and forecast through mathematical models such as the ones previously mentioned the most probable production and cost under given work conditions.

The purpose of these studies is to avoid as much as possible trial and error methods, speed up the development of machinery, reduce development cost to a minimum and minimize the chances of spending money on machines that are not suited to logging conditions.

Work analysis is also a very rewarding by-product of production studies as it permits defining work methods that yield maximum production. The definition of best work methods may then serve as a basis for the elaboration of a training program.

As mentioned at the beginning, poor communication system is a main source of difficulties for the woods manager. Analysis of the organization and communication mechanism is always a very important one, upon which depends the success of various techniques such as the ones just presented. An example of a communication system analysis, called goal maintaining system, is based upon the following communication cycle: actual results are compared to a predetermined goal; causes for deviation are investigated; appropriate decision is taken and fed back to production center; production process is modfied accordingly.

Numerous other problems could be solved through operations research. Labor problems for example, form an important class of problems where OR can be helpful. The use of a flow diagram for defining the problem is very commonly used by OR technicians as it greatly helps defining the problem. As you all know, a well defined problem is half solved and enough time must be spent on this important part of a research project.

I do not want to continue unduly this introduction to OR techniques. The examples just presented are sufficiently numerous to make you appreciate the possibilities of using this new science for solving management problems met in logging. To conclude, I would like to stress the following points:

1. Owing to greater competition for woods product on the national and international market the logging industry must find some means of lowering the cost of its raw material.

2. One way to lower this cost is to make a better use of production agents, man, material, money, and machine.

3. To reach this objective better managerial planning and control of logging operations is necessary. However, for numerous reasons planning and control of logging operations is very difficult.

4. Applications of OR techniques have shown that problems are not insurmountable and that greater use of this science will considerably improve managerial decisions.

Financial success of the logging industry will always lie on the experience and judgment of the intelligent woods manager but scientists and mathematicians may soon have to play a more important role.

Combination of practical experience and technical know-how will be for the logging industry a guarantee of continuous progress.

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*Text-books that require a fair amount of mathematics for a sound understanding.

The all-hydraulic Hopto 307 Log Grapple has high 19′ reach, 20 second loading cycle. One man operates the unit. A grapple rotor lines up the load while boom is swinging for faster pulpwood handling.

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Veteran logger chooses a D6 for salvage logging

BILL RAYNOR got the job cleaning up 1½ million feet of small timber for the U. S. Forest Service near Sandpoint, Idaho. He picked a Cat D6 Tractor with Bulldozer and Hyster Winch to handle the job. Why? "After working around many areas—always around Caterpillar-built equipment—I know at firsthand they can't be beat for economy and long life."

Men like Bill Raynor who depend on their tractors for a living know the importance of using the *right* machine for the job on hand. The D6 is *right* for handling this type of timber. As for output, it has always been designed to do more work at lower cost than any machine in its power range.

That goes double for the new D6 Series B. Stacked against the previous model—or against any tractor of comparable size—the new D6 is way out front. Some reasons why:

NEW ENGINE—a Cat D333 Diesel Engine (93 flywheel HP . . . 19,495 lb. max. drawbar pull) delivers 25% more lugging ability. And a new direct acting governor results in faster load response.

NEW INTEGRAL HYDRAULIC SYSTEM gives you more work power at the tools. Under-the-hood mounting of tank, pump and valves permits convenient routing of hydraulic lines to bulldozer or implement cylinders, frees front and rear for attachments.

NEW OPERATOR CONVENIENCE—An all-new cockpit has coordinated controls that make the tractor operate almost as if it knew what was needed next.

In addition, the new D6 Series B features dry-type air cleaner, hydraulic track adjusters (optional), lifetime lubricated track rollers, the oil clutch and forward-reverse lever. Get the full details from your Caterpillar Dealer. Ask for a demonstration—see for yourself how the new D6 delivers greater production on the job!

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MODERN
HEAVY-DUTY MACHINES
FOR THE HARD WORK

Hardwoods Can Lift World Literacy

Processes using 100% hardwoods, such as new Noralyn system, offer hope to fiber-hungry, softwood scarce nations

By J. H. AINSWORTH
Vice President
Noralyn Paper Mills, Inc.

● There are, in the world today, 1100 million people who are voiceless . . . 1100 million people who cannot read nor write.

Over a billion people, in Africa and Asia alone—over half the world's population—are totally illiterate.

Illiteracy in Somaliland is 99.9%. Only one tenth of one percent of Somaliland's people can read or write. Portuguese Guinea has 99.7% illiteracy; Portuguese Mozambique, 99%, and the British Solomon Islands, 95%. *Paper consumption among these mentally undernourished peoples is either non existent or away behind the decimal point.*

Now, let's flip over a page and scan the black figures on the credit side of the ledger.

We find Sweden at the head of the list with the world's lowest illiteracy rate—estimated at zero.

In America we have 5 million illiterate people—3% of our population cannot read nor write. Perhaps we had better restate this statistic by saying 97% of America's people *are* literate.

Now, back to our hypothesis that there is a recognizable relationship between paper consumption and literacy.

Both the United States and Sweden are paper gourmets. The United States far outstrips all other countries. Its per capita paper consumption is 435 lbs. Canada is next with approximately 300 lbs. and Sweden third with 200 lbs. (And it is comforting to we quasi-intellectuals to know that paper consumption behind the iron and bamboo curtains averages a mere 10 lbs. per person, per year, perhaps).

Paper a Criterion of Literacy

But how logical a criterion of a country's literacy is paper?

It must be granted that there is no direct mathematical correlation between the degree of literacy of a people and their paper appetites. We cannot compile tables, draw a graph or write a neat equation which will develop the answers to human values. First of all, we would have to define education.

Forests Related to Paper

But there is a definite correlation between the tree of knowledge and trees for paper.

It should follow that since it takes trees to make paper, the densely-forested areas of the world should be the most literate. Let's explore it.

I have listed the major continents in order of the *percentage* of their total areas in forests.

South America	43%
Europe	38%
North America	30%
Africa	28%
Asia	20%

If our theory holds water, South Americans should be the world's most literate people. But it may be that the forest wealth of South America is not being put to good use. And there may be a reason. It could be that much of the forest is composed of species which cannot be successfully used for papermaking.

So, let us go a step further and relate South America's forest areas to that of the United States and Canada, the two greatest papermaking and paper consuming areas in the world. We find that Canada has 44% of its total area in forests, South America 43% and the United States only 32%. What does this do to our "egg head" quotient?

Now, let us explore the statistics which develop when we relate forest area on the basis of acres per person.

Canada	65 acres
Belgian Congo	28 acres
Brazil	20 acres
United States	4 acres

True, such a statistic as 65 acres of forest land per Canadian and 4 acres per American develops from a disparity in population. Canada, a country larger in area than ours, has a population of only 17 million to our 170 million.

But is this not all the more reason why we should use all our natural resources judiciously? We cannot afford to ignore the "maverick" species of our forest wealth.

And this is not all!

Per capita paper consumption, in America, has increased from 58 lbs. in 1899 to 435 lbs. in 1959—750% in 60 years.

And most of this has to come from a forest wealth of only 4 acres per person.

Pulpwood comes 60% from the Southern states, 35% from the balance of the country and 5% is imported from Canada.

On the face of it, this might seem a bit alarming. But, let us say, in defense of the poor, often-vilified papermaker that he uses only about 13% of the timber consumed annually—and much of this is now coming from sawmill waste. Furthermore, the paper industry is now recovering 30% of its production in the form of waste paper.

Importance of Paper

Papermaking is our nation's fifth largest industry. In value of shipments made it is exceeded by only motor vehicles, meat, steel and petroleum.

The paper industry is a lubricant to the wheels of all other industry.

The per capita consumption of paper in America has risen 750% since the turn of the century. When you think of the population increase over this past 60-year period, and relate it to a 750% per capita consumption increase over the same period, you begin to wonder how the paper industry has kept pace with demands for its products. It hasn't!

It is predicted, by the industry's most reputable swamis, that we will *produce* 36 million tons of paper *this* year—6% more than we produced last year. But last year we *consumed* 38.5 million tons—2.5 million tons more than we expect to *produce* at this

year's elevated figures.

To make up our paper deficit we import over 600 million dollars worth of paper annually, mostly newsprint, from Canada. A portion of this is offset by about 2½ million dollars in *direct* paper exports. Of course, *indirectly* our paper exports are much higher. In the manufacture and shipment of motor vehicles, 30 million dollars of paper is used annually.

How long can we, with our champagne appetite, continue to meet these demands, drawing from a forest inventory of 4 acres per person? Not long without sane forestry practices. And sane forestry means total utilization. And total utilization means finding methods which will allow us to use our "maverick" species rather than leaving them as dregs in the bottom of our forestry barrel.

Need for Intelligent Use of Forests

When we study predicted population increases and per capita demands for products derived from our forests, it does not necessarily point up a situation which gives causes for alarm. But, it does point up the need for intelligent planning—not sometime in the indefinite future, but *now*. This is no time for following in grandfather's footsteps. It is a time for reviewing grandfather's forest policies and profiting from his mistakes.

In the past 350 years—since the days of the first settlers—we have grown 12% more timber than originally existed. But the important point is, what has been done with it? Have we wasted it or used it productively? 41% was killed by disease or went up in smoke. 21% was used for wood products, 15% for fuel and 14% was destroyed to clear land. Today, only 9% of the total remains.

Our first inclination is to be shocked by the seemingly fantastic wasteage of our forest resources. But let's not forget that clearing land was necessary, and the forests of North America were, after all, a key factor in the building of this great democracy. Since the declaration of independence, in 1776, the lumbering industry has produced nearly three-million-million board feet of lumber—enough to build three-hundred million five-room houses, or a boardwalk six feet wide all the way to the sun (although it is hard to see why anyone would want to do that).

And there is still enough saw timber standing in the forest today to build a six-room house for every man, woman and child in the nation, with lumber left over.

What About Other Materials?

Although the paper industry consumes only about 13% of the wood drained from our forests, perhaps we should turn to other fibrous materials for papermaking How about rags? Rag consumption rose from 200 thousand tons to 700 thousand tons over a period of 50 years between 1879 and 1929 and then proceeded to take a toboggan ride. Our consumption of rags is now back to turn-of-the-century level.

Straw consumption rose from 240 thousand tons in 1879 to a peak of 660 thousand tons in 1941. Modern economics have now nudged strawboard through the museum door. Straw consumption is now *below* the 1879 level.

Esparto, bagasse and other exotic fibers reached their collective peak in 1953.

Hardwoods the Answer

But there is an answer to additional demands for papermaking fiber —HARDWOODS!

Hardwoods comprise an important part of the forest wealth of most of the world's timbered areas.

In the southern United States many species of hardwood have a faster growth rate than coniferous woods, and, up to the present, vast stands of such timber have barely been tapped. Except as a filler-fiber, hardwoods have been largely neglected.

But with the development of the Noralyn Process the stigma has been removed from Southern hardwoods. Hardwoods, "the Fiber of the Future," are no longer the "mavericks" of the forests. Hardwoods are "the Fiber of Today."

With the proving of a practical procedure for the fabrication of an all-hardwood sheet millions of acres of forest lands in this country are enhanced in value.

The international potentialities of such a process—especially in many of the world's heavily forested areas, where little else but hardwoods are available—is obvious.

Indirectly, the use of these hardwoods could be a very real contributing factor to education and through education to international understanding. The expansion of the paper industry is a logical yardstick for the measurement of man's social progress.

It is our sincere hope that the Noralyn Process—through proving the practicality of using hardwoods—will stimulate research and be a contributory factor not only in opening the door to industrial expansion, but to education, and the free interchange of ideas which will eventually, one day, lead to tolerance and understanding among all men.

Production Steps in Hardwood Newsprint

By W. L. BELVIN
Director
Herty Foundation Laboratories

During October 1958, pulp from three species of hardwood produced the first successful hardwood newsprint sheet to be made on the Herty Laboratory's paper machine. The sheet was an excellent one, according to Belvin—equal, and perhaps superior, in quality to newsprint on the U. S. market at the time.

The second major step was marked by the production of 10,000 lbs. of hardwood pulp on the laboratory equipment at Herty—a major accomplishment in itself. During the heat of the summer months, the pulp was shipped in refrigerated trucks to Combined Locks Paper Co. in Wisconsin and newsprint manufactured on the company's large papermaking machine. This was the first production run. The resulting 1,500 lbs. of newsprint was then subjected to rigorous tests under standard TAPPI testing procedures. It was found to be of superior quality, said Mr. Belvin.

With eight full-size rolls to work with, printability tests were carried out, which marked the beginning of step three. The *Milwaukee Journal*, using Noralyn newsprint, achieved a printing speed of 46,000 copies per hour. This is the top speed on their printing machines. The paper went through the machine without a single break, while conventional newsprint of premium quality broke frequently. The *New York Times* made a run of 38,000 copies per hour without difficulty. At Savannah, 42,000 copies per hour were printed which is the top speed of the machine. Subjection to rigorous testing procedures, exceptionally long machine leads (as great as 38 ft.), and frequent right-angle turns failed to cause breaks in the Noralyn sheet during printing.

The Noralyn process for newsprint manufacture is competitive to other present day newsprint manufacturing processes, says Mr. Belvin. He feels a sheet made 100% from hardwood constitutes a maior breakthrough in the technology of newsprint manufacture.

Hardwood Use from Forester's Viewpoint

By P. R. WHEELER
Forces Economist
Southern Forest Experimental Sta.

From a forester's view, Mr. Ainsworth has made—or implied—three points which elaboration may help to emphasize:

First—Hardwoods do form a very large part of this world's forest wealth.

Second—Hardwoods as a group have not been utilized in relation to the proportion they make of the total wood supply.

Third—Within the hardwood component, species selection for utilization continues to operate against nature's balance.

Two-thirds of this world's forests are hardwood; 80% of the forests of the Free World are hardwood. Most of the hardwoods are found in the tropics where exploitation has been hampered by lack of knowledge of species suitability for use—whether traditional use or some use yet to be developed.

The determination of suitability has been seriously slowed by the multiplicity of species—often removed in the thousands in contrast with the two-odd commercial species in the U.S.

Of these several thousand species elsewhere, however, many appear to have the weight and texture which should prove suitable for paper, perhaps newsprint furnish. Increased use of hardwoods will increase the value of the world's forests.

In the U.S., where the use of hardwoods has received increasing attention, hardwoods as a group are still not being utilized in relation to their availability. In the South, for example, the use of hardwoods for pulp has increased to 16% of total roundwood production. This use may increase to 25% within the next decade or so—but the proportion is still far short of the 50% of the forests that hardwoods comprise. If the forest resource is to be used wisely, all segments of the industry should continue to strive for increased hardwood use. D. J. MacLauning, and others have repeatedly pointed this out.

Several mills in the U.S., Canada, Italy, and Australia are using hardwoods for newsprint, book paper, tissue, and other products.

Within the hardwoods group, individual species selection was operated to unbalance the resource. In the South, in 1958, almost 90% of hardwood used was from the gums and other soft-textured species—which comprise only 40% of the hardwood timber supply. Obviously the soft-textured species will be in shorter supply in coming years, and competition for them will intensify. Meanwhile the problem of utilizing the increasing over-supply of firm-textured species becomes more serious.

Maverick species are transient. What is considered worthless today often is of value tomorrow. Until they become useful they pose a problem. On the other hand, industry preferences for use of the species often serve to compound the problem locally.

In Mississippi the gums are currently in short supply. Excessive use now of sweet gum of pulp size will seriously curtail the supply for furniture and veneer in the years to come. Cottonwood, never in real abundance, may join sweet gum.

To keep the timber resources in balance, still more ways must be found to use species in proportion to their occurrence—or, in the future, high costs of changing or converting composition will be required. These future costs will be a profit barrier and will endanger the competitive position of paper.

International Impact of Pulping Process

By J. R. OWENS
Director, Forest Products Div.,
Bus. and Defense Services Admin.

The faster that growing hardwood species—as a group and individually—can be blended into "furnish" in relation to their occurrence, the stronger the pulp industry will become. Any process that promotes the increased use of hardwood contributes to your mutual strength.

In considering the possible international impact of this or any other similar process, there are two important questions:

(1) Can the process be successfully adapted to the pulping of various other natural mixtures of temperate zone hardwoods?

(2) Can the process be successfully adapted to the pulping of various natural mixtures of tropical hardwoods? The much wider range and variety of characteristics of tropical hardwoods, including density and varying contents of silica, gums, and other substances in the wood, make this second question especially tough.

If the process can be successfully adapted to the pulping of various other natural mixtures of temperate zone hardwoods, it might have application with substantial effect in some countries already among the world leaders in pulp production. In Japan, for example, where there is more hardwood than softwood in the total volume of standing timber, it could materially increase the resource base for pulp manufacture.

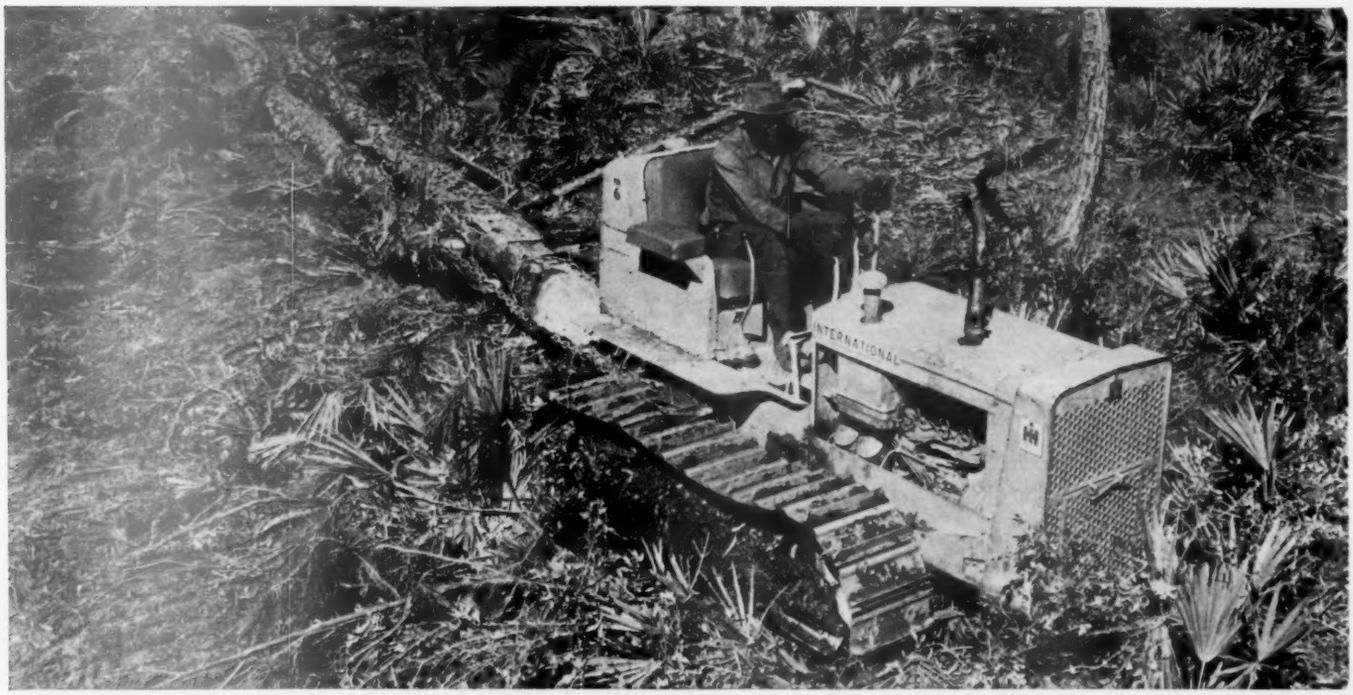
To lesser degree, this could also be true in Western Europe, with 54% as much hardwood as softwood; in the United States, with 48% hardwoods; Canada, with 28% hardwoods. Russia has 80% softwood and 20% hardwood, chiefly birch and aspen.

If the process can be successfully adapted to the pulping of various natural mixtures of tropical hardwood, its possible impact in the international field would, of course, be substantially greater. It is partly but not entirely coincidental that the areas which produce 97½% of the world's woodpulp have almost exactly the same percentage of the world's volume of coniferous timber (North America, Western Europe, U.S.S.R. and satellites, and Japan).

On the other hand, the developing countries, which produce less than 2½% of the world's pulp, have approximately 70% of the world's hardwood timber, most of it in the tropics. These include some of the countries of Free Asia, especially Indonesia, Thailand, Burma, the Philippines, India, Laos, and Malaya, and some of the countries in Africa and in Central and South America. These countries are also near the low end of the scale in per capita consumption of pulp, paper and paperboard products.

By itself, the development of a suitable process for pulping tropic hardwood mixtures would not, of course, assure that any of these countries would become more important factors in the world production of woodpulp.

By and large these are the underdeveloped countries of the world, often lacking the capital, the domestic demand, and other essentials for initiating major industrial operations—indeed, often lacking the climate for attracting some of these essentials from other countries. Nevertheless, the development of such a pulping process could be one of the foundation stones to substantial pulp industry expansion in some of these tropical countries.



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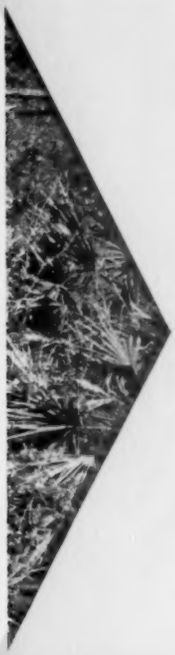


"THIS NEW TD-6 KEEPS plenty of pulp ON THE CUTTING DECK"

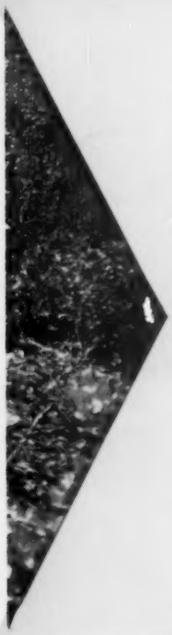
—D. L. Wainwright,
Brunswick, Ga.

No "babe in the woods" on tractor logging, Pulpwood Contractor D. L. Wainwright, Brunswick, Georgia, has been "at it" for 14 years—with various makes and sizes of crawlers. His newest, the 55-hp International TD-6, wins his top rating!

"I like this new TD-6 better than any crawler I have previously used in pulpwood operations," he declares. "It maneuvers better, has very good flotation, and the new 6-cylinder engine gives me the kind of performance that keeps plenty of tree-length pulp on the cutting deck.

"The new TD-6 is easy to start, has snappy governor load response without engine lug-down. All-around balance and flotation enable the TD-6 to log swamp terrain with very satisfactory production."

By "very satisfactory production" Mr. Wainwright means decking up to 150 cords of pulpwood per 40-hour week—snaking out loads from as far as 1,500 feet—with his new TD-6!



"SMOOTH 6-CYL. ENGINE PRODUCES unmatched power FOR TD-6 SIZE"

Garris-Evans
Lumber Co., Inc.
Greenville, North Carolina

Loads of 600-bf and upwards are ordinary for the 55-hp TD-6 owned by Garris-Evans Lumber Co., Inc., Greenville, North Carolina—even in adverse conditions.

"Compared with tractors previously used," reports Woods Foreman W. L. Cox, "This new TD-6 has faster work speeds. The smooth-operating 6-cylinder engine is producing unmatched log pulling power for the TD-6 size.

"We particularly like TD-6 direct starting and easy handling. The new design rollers are holding up perfectly under extreme swamp work conditions. We also find the TD-6 easy to service."

Production of 50,000 to 60,000 bf per 45 hours is reported of the Garris-Evans TD-6—logging pine timber from the Moye Tract in Greene County, North Carolina. The TD-6 is burning only 7 gallons of low-cost Diesel fuel in 9½ hours! "Less fuel than previous rigs used!" comments Woods Foreman Cox.

Compare TD-6 high-production advantages to anything else on tracks in its power class.

You get the smoothness and work wallop of high-torque, 6-cylinder power in the TD-6. And this direct-start, fast-governed engine features the most simple, efficient, and compact rotary-type fuel-injection pump built!

Full-face sintered metal engine clutch driven member gives the TD-6 *dry-type* engine clutch high power-transfer efficiency—plus heat-defying performance. Only the TD-6 gives you the *minimum maintenance advantages* of International Dura-Rollers. These thick-shelled track rollers with seal-protecting vents provide king-sized lube capacity for 500-hr. intervals between lubrications!

Press the direct-start button—prove 55-hp TD-6 capacity and operating ease. Give new long-track advantages a traction-flotation try-out in tough logging conditions. Let a "free-for-all" demonstration prove how the TD-6 can increase your production, whack your costs! Let your International Construction Equipment Distributor demonstrate.

Safety Is Good Business

Industry record shows some 25% of pulpwood companies, with 30% of loggers, had 54% of industry's disabling injuries

By R. D. GIDEL
Chief, Div. of Safety Standards and Services, Bureau of Labor Statistics, U.S. Dept. of Labor

● Reason and logic fly out the window when a human is personally involved with a situation. Yet, to make the most impression on one you must personalize your pitch to his interest. "What's in it for me?" is the first thing you'll be asked.

If his reason and logic have flown you'll somehow have to attempt to supply him with some of your own making. If it hasn't flown, then you still have to compete with all the diversionary elements our modern civilization provides in order to get through to him.

We are in an era of repairmen who can't repair, executives whose minds are executing maneuvers on the golf course, school systems full of cinch courses for students, and mothers who spend their time in clubs saving the world while letting their kids run wild. We are hep to three-day weekends, two-hour lunches and half-day coffee breaks.

The typical philosophy of the age is that of the young mother who was overheard in a department store elevator the other day. She was telling her husband, "If we miss two payments on the washing machine, and one on the refrigerator, we will have enough money for a down payment on a television set."

Even teachers are passing the buck in their report cards on the students' performance at school. Instead of saying the kid is lazy, they note, "He needs supervision to work well." Instead of saying the kid is a bully, they note, "He needs help in learning to use qualities of leadership democratically." Instead of saying the kid stinks, they note, "He needs guidance in development of good habits of hygiene." When they note, "He seems to feel secure only in group situations, needs to develop a sense of independence," it means he roams in gangs.

It's also an era of double standards.

We rave about high auto insurance rates—then conspire with the repairman to fix a fender not covered by the policy.

We go on strike to prevent a buddy from being fired—then run him down in our car while he is crossing the street.

We spend our time sterilizing the baby's food, then leave aspirin and other hazardous items lying around for him to snack on.

"We complain about retirement benefits being too low—then take no pains to keep from getting killed before we get a chance to use them.

Experts on human behavior say we also share a dangerous tendency toward pattern thinking. That is, we base our judgments on past facts that may no longer be accurate.

A man's judgment sometimes gets warped when he faces comparable situations repeatedly. For example:

We pass a railroad crossing every day for years and never see a train—so we don't bother to slow down and look any more. One day, whammo, we've had it.

We work on equipment for years without protection. We have our reflexes tuned, know when to dodge and let go. One day, being human, our timing is off a little, or something unexpected happens. Whammo! —look ma, no hands.

This is the story of accident prevention. We can't base our judgment on past facts that may no longer be accurate.

Must Reach the People

Now, how can we get people interested in safety when they have such current philosophies and as such, feel there are much more work involved and important things to worry about than some dull, monotonous, routine such as "look out or you will hurt yourself."

We have to learn to count down—and learn when to blast off. We have to get into orbit and make sure our transmitters work on a receptive wave length. We must have the energy and bounce that the "Playtex" people build into their product.

Our problem these days isn't that we don't know how to prevent accidents. We have the technical know how, the systems for recording injuries, investigating injuries, methods of training and supervision, means for providing mechanical safeguarding and all sorts of personal protective equipment and devices. We have ways of finding out the toxic limits for hazardous materials and we know how to set up controls to cover most any situation. These are fairly easy.

ROBERT D. GIDEL

Our problems now deal with mainly two entities. The boss, and the worker.

How can we make the boss realize safety is an operating problem and deserves his attention and support?

How can we plant a spark of self discipline in the worker?

To reach the worker, we must compete with every other subject seeking his attention: radio, TV, taxes, unruly kids, and maybe a mother-in-law. We have to personalize to him the need for looking out for his well-being. We must convince him that he must be safe as well as use a deodorant each day.

We must convince the boss that accidents don't just happen. That a certain number of accidents are not just naturally inherent in a job because it has been that way for years.

We must convince the boss that if his injury rate is high there is something sick in the way he does business.

Men are not expendable, any more than machines or equipment.

Unfortunately, many bosses do not understand these things until the Workmen's Compensation Board becomes a senior partner in the firm—or they have trouble getting good men to work for them—or some governmental body starts regulating them.

High Pulpwood Injury Rate

During the ten years, 1945 to 1955, the all manufacturing injury frequency rate dropped 34%, from 18.4 to 12.1 disabling injuries per million man hours.

During this same period the injury frequency rate for pulpwood logging showed no appreciable change, being 76.2 and 75.5 respectively.

Only stevedoring, and a few mining activities have higher rates—and stevedoring is now subject to a federal safety code.

At a rate of 75 disabling injuries per million man hours, every worker in the industry can expect a disabling injury every 6 or 7 years.

As I reviewed this data several questions came to mind:

(1) Do pulpwood loggers consider safety in their operations? Is logging really this hazardous?

(2) Can pulpwood loggers afford to pay up to 25% of payroll for insurance to compensate injured workers? If so, isn't this still poor business?

(3) What is wrong with using foot and leg protection in this industry? What is wrong with taking other necessary precautions?

Apparently the work can be done safely, since 53% of those considered in the last study reported no disabling injuries. Something seems strange when 25% of the establishments employing 30% of the loggers had 54% of the disabling injuries.

During the next decade we will have a relative shortage of men in the prime working ages. Our most productive population will be decreasing while our less productive population and the overall demand for goods and services are increasing.

To keep pace with such a situation there are three essentials. We must:

(1) Conserve the manpower we have

(2) Upgrade its skill

(3) Increase its productivity.

The techniques of a good accident prevention program will help achieve all three.

Basic Personalizing Problems

As I see it, we have at least three basic personalizing problems in our battle against occupational injuries. They are:

(1) How can we personalize ourselves to the times?

(2) How can we compete with diversionary elements by personalizing safety to the individual?

(3) How can we personalize safety to management and convince it that safety is an operating problem and a cost factor which can not be overlooked or forgotten?

It isn't easy to get through to people these days. You wouldn't try to sell a modern young girl a pair of high button shoes. You wouldn't try to sell a young hot-rodder on the b nefits of his owning an old Essex. The boss wouldn't be interested in a matched team of water buffalos. Yet, in effect, we're trying to do all three of these things unless we bring safety to the immediate personal level of the individual by relating it to current events, current problems, current interests, personal objectives and benefits.

In other words, we've got to get our techniques out of this world, up with the stars, because that is where people are looking or their minds are functioning. Safety has to be, for everyone, all the time, as intimate to him as anything he owns, uses or covets. It has to fit like an old shoe to any and all occasions he faces hour by hour, day by day, on or off the job.

We safety men are really on thin ground in our work. If management would ever really get smart and:

(1) Select and place workers—matching job requirements with personal qualifications.

(2) Train and supervise on basis of job problems, elements.

(3) Schedule operations considering human as well as physical factors.

(4) Purchase on basis of specs considering hazards of machines, materials and equipment as well as operating specifications.

(5) Layout, plan and design, allowing for effective functioning of the human as well as the physical, mechanical and chemical.

(6) Maintain equipment and facilities to keep them operating safely and effectively.

(7) Help condition the employees' attitude toward his job as one of self discipline.

If management did all this, we safety men could fold up and fade away like the old harness manufacturers did.

Fortunately, industrial management has not yet become so proficient that it doesn't, at least, need a coordinator, or bird dog, to see that these things are actually accomplished. That's where we come in.

Guidepoints for the Future

I have discussed a few points and asked a few questions. I mention the following things we know, as a possible guide for the future.

(1) We know that the accident problem is no longer predominately a physical one—that it has to do with people—how they act, react, what motivates them, how to maintain their interest and support in working—for all things—their own welfare.

(2) We know that safety doesn't stop when the job ends. The safety training and education the worker gets on the job carries over to the home, at play, and on the road. That is why it is so important that they get some safety on the job. If a man is hurt on the road or in his bathtub he is just as absent from work as if he were hurt on the job.

(3) We know that we must get safety into the schools, colleges, apprenticeship programs, vocational education—to educate and preserve our youth—since our youth are our future.

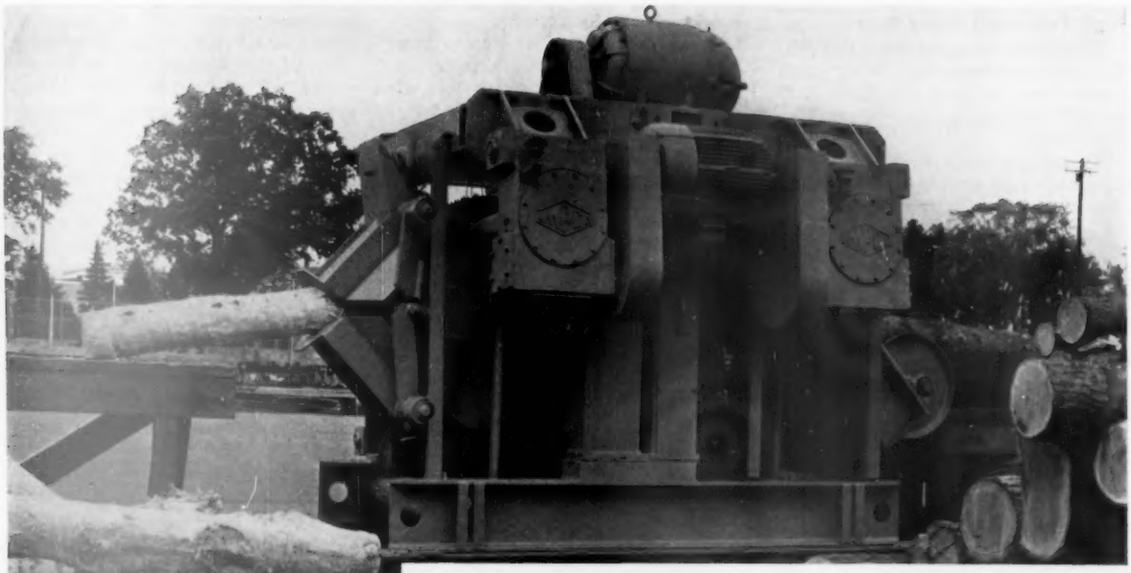
(4) We know that you can't legislate safety. You can force compliance with certain bare minimums, with continuous policing—and we need codes and regulations to establish minimum standards. But to do an effective job the employer and the employee must both be sold on its worth. There must be set up in every organization in the nation a continuing day-by-day safety program participated in by every employee. You cannot establish that by legislation alone.

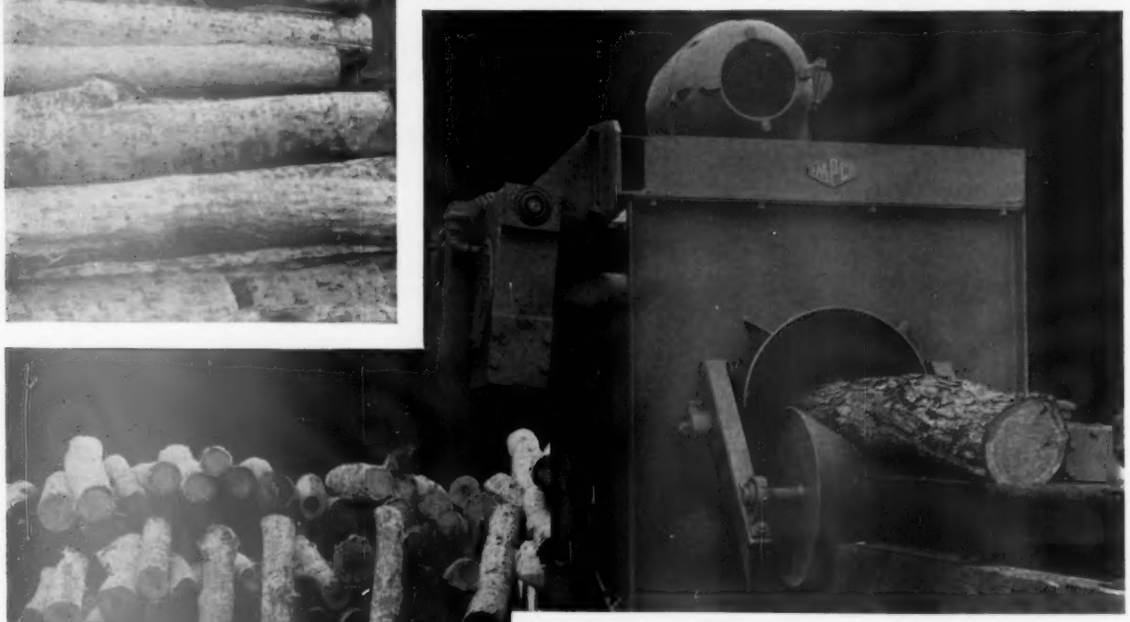
(5) We know that trade unions must take up their responsibility to promote the safety of their members. Locals should have safety committees, internationals should have safety directors to provide assistance and guidance to the locals. The unions should cooperate with management in seeing that every job is accomplished in the safest way possible.

(6) We know that even though more glamorous and dynamic developments occur, scientifically and productively—the same old horse-and-buggy causes of injuries will still be killing and hurting most of the people. We'll trip over something, fall off something, be struck by something, take chances, not read instructions, go too fast for conditions, take short cuts.

(7) We know that you don't sell a businessman on initiating a safety program just because someone might get hurt, or did get hurt on the job. They have to be convinced that it is good business—and there are plenty of statistics showing this.

Present day accident prevention is a dynamic business. It cuts across all lines: research, engineering, production, promotion, and personnel. It must keep one jump ahead of industrial development—and that's a little like trying to say how many children you'll have before you get married.





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TECHNICAL COMMITTEE CHAIRMAN participating in panel (from left): G. W. Abel, panel chairman, Owens-Illinois Glass Co.; H. H. Flickinger, International Paper; R. L. DeLong, St. Regis Paper; S. K. Hudson, Container Corp. of America (who reported on Southwest developments in an off-the-cuff talk); R. F. Bower, Hammermill Paper Co.; and F. N. Fixmer, Mosinee Paper Mills Co.

APPALACHIAN

Excess of Growth over Drain is Reflected in Competitive Stumpage Prices

By R. F. BOWER
Hammermill Paper Co.

● Pulpwood production in the Appalachian-Allegheny region is quite different from other forest regions. Topography is often steep and rugged, and timber types are predominantly hardwood with oak being a major component over much of the area. Timber stands are comprised of second-growth and vary from poor, scattered stands with many poor quality residuals to vigorous well-stocked stands of valuable pole and sawtimber sized trees.

Over the region as a whole, growth substantially exceeds drain and stumpage prices reflect this situation. On the other hand, logging costs are considerably higher than in the South, but lower than in the northeast. The result of these related factors is a vigorous pulpwood business in the hands of many small independent producers, with market prices for delivered wood which are competitive with the entire industry.

We will report briefly on two of the more efficient operations conducted by independent producers in the region.

The first is the operation of W. H. Byer of Covington, Va., who is producing pulpwood from privately owned stumpage in the Appalachian Mountains west of Covington. Topography is often steep and rugged, and the forest stand contains numerous low quality, larger diameter trees. The resulting pulpwood is much larger in size than that produced in some other regions.

On this operation two men and a horse work together as a production unit. The trees are felled, limbed and skidded tree-length to a truck trail, where they are bucked into 60-inch pulpwood sticks. These men also help load the wood for trucking. Production averages about 5.5 cords per crew per day. A small crawler tractor is also available for the more difficult skidding jobs.

Pulpwood is delivered directly to the consuming mill by two conventional two-axle trucks. One truck is equipped with homemade wooden pallets which are loaded at ground level in the truck trail and then pulled up onto the truck with a truck winch. The other truck is a conventional stake body pulpwood truck. The average load is about 3 cords. The hauling distance averages about 20 miles. The trucks are unloaded at the mill mechanically.

The normal crew consists of: 4 cutters, 4 skidders, 2 truck drivers, 1 supervisor. This 11-man crew works 40 hours per week and produces and delivers an average of 100 cords per week. The average production rate is 4.4 man-hours per cord from stump to mill.

The second operation is that of George Spilka of Sheffield, Pa., who is producing pulpwood and sawlogs from stumpage purchased from the Allegheny National Forest. The operation is an improvement thinning averaging 618 cords per acre plus sawlogs. The stand after cutting averages 80 sq. ft. of basal area with a good distribution of size classes. Topography varies from almost level to very steep, and is typical of the Allegheny Plateau in northwestern Pennsylvania.

Trees are cut and bucked into 48 in. lengths at the stump. The cutter also tosses the pulpwood sticks into small piles to facilitate draying.

All wood is drayed from the stump to a truck road on a 2-wheeled cart carrying a 1½ to 2-cord load, and drawn by a small crawler tractor. At roadside it is piled down or transferred directly to truck. Draying distances vary but average 300-400 feet. The tractor driver loads and unloads the cart.

Trucking and handling is accomplished by a 3-axle truck hauling a 4-cord load, and equipped with a Hiabob hydraulic loader and a hydraulic grapple. The hauling distance is 12 miles and the wood is delivered to a rail siding and loaded into gondola cars.

The crew consists of: 2 cutters, 1 tractor operator, 1 truck driver, 1

SMALL CRAWLER TRACTOR draws two-wheeled cart from stump to truck road.

TWO-CORD CART is loaded and unloaded by tractor driver; draying distance is 300-400 ft.

HYDRAULIC LOADER and grapple makes truck loading a one-man operation.

AT RAIL SIDING, one man again can load wood into gondola cars.

working foreman. This 5-man crew works a 40-hour week, and produces and delivers 50 cords per week. The average production rate is 4 man-hours per cord.

Both of these operations have the advantage of accessibility. Public highways provide transportation arteries. Road construction is limited to short access roads where required to keep skidding distances within reason. Labor is quite readily available locally and no camps or housing is required.

This short presentation has shown you two of the many ways in which 3 million cords are produced and delivered to mills in the Appalachian-Allegheny region each year.

Stresses Logging Equipment That Can Be Made or Purchased by Small Producers

By J. A. ALTMAN
APA Forest Engineer

● The area included in the Appalachian Technical Committee is a region with hardwood timber resources ample to meet the needs of all present mills. Because of the favorable stumpage to demand ratio, most competition in the region is for labor to produce the pulpwood rather than for the stumpage itself.

Our activities in this region are primarily directed toward analyzing present procurement programs and modifying these programs to meet anticipated needs of the future because apparently a tremendous upsurge of energy is being devoted to new uses for hardwoods similar to those found in this region. Some of our actions within the past year have taken the following forms:

1. Several mills have very recently undergone extensive modernization and enlargement of facilities or are planning to do so in the very near future. One key item in these rebuilding plans that bears directly on wood procurement is the lay-out and facilities of the mill woodyard. As there are several methods of unloading and handling wood available today, and since mechanization in the woods is determined to some extent on how the wood is handled in the yard, we feel that woodyards are a vital part of our wood procurement.

Under the direction of Dave Sowers, our group has made a movie showing how wood is handled in dif-

ferent yards in the Appalachians. This movie has been invaluable in conferences between procurement personnel and mill personnel on woodyard design and will be beneficial to any mill making preliminary plans for a woodyard.

2. We have a bountiful supply of stumpage available in the Appalachians and our aim is to keep it that way. We are doing this not only by good management of our own lands and encouraging proper management on private lands but we also have a program that keeps us in very close contact with the officials of our public lands. These public lands occupy a sizable portion of our region and are usually managed according to good forestry practices. With our program of working closely with the officials of these lands we are securing more and more of their stumpage, which tends to keep the total sources of wood supply available to our mills quite adequate.

This past year has also seen three more of our mills begin the use of purchased chips, both pine and hardwood, as a means of conserving and perpetuating this wood supply.

3. Probably the most interesting part of wood procurement, and one which has received the least attention, is relations with the people from whom we purchase our wood. Most of our Technical Committee members feel the pulpwood to run our mills must necesarily come from relatively small producers.

Our members have requested that I, as Forest Engineer, concentrate my Technical Releases on logging equipment to small logging and mechanization items that can be made by the producer himself or to items that are within the producers ability to purchase. These members have also requested that the Technical Review portions of our Technical Committee meetings stress this type of mechanization.

The feeling is that if the producer is to be up-graded we must start with where he is today and lead him along with his mechanization, rather than try to stress large expensive types of logging equipment that are out of his reach. Some of our mills are extending this close relationship with the producer by issuing periodicals designed especially for the producer that are written in language he can understand. Some of the items covered in these publications are:

A. Safety, in which actual logging accidents are described and solutions for preventing accidents of this type are offered.

B. Mechanization that describes types of logging equipment which is in use in the area with production rates and costs of this type of equipment.

C. Want-ad Section that lists tracts of stumpage for sale as well as various pieces of logging equipment for sale. This service is presented free in these publications.

D. Long and short range predictions on the mills' demand for various species of pulpwood. This enables the producer to base his plans on the actual market conditions.

E. Any other items of interest to the producer such as hours that the wood office is open, holidays on which the yard is closed, information on forest management and availability of seedlings.

Each of our mills exchange these publications among themselves.

I would like to conclude by saying that mechanization has, in general, progressed at a substantial rate this past year throughout the entire region. For the past two or three years now predictions have been made that the pallet system would spread to the Appalachian area. Most of our mills now have several pallet-equipped operations supplying the mills. They are usually of the homemade type that are constructed of heavy oak lumber and in most cases are proving quite satisfactory.

There has been a marked increase in the number and use of the small crawler tractor. This tractor is too light for our road construction work but it is common in the Appalachian woods on pulpwood jobs for logging and road maintenance.

The Morbark Pulpwood Barker is receiving considerable attention at several of our mills, especially in the northern portions. Long fibred wood, particularly spruce and pine, is not prevalent in this region and the mills are experimenting on debarking these species in the woods as a means of cutting down on the freight and handling costs for these long hauls. There are also quite a few of these machines around which are company owned and are used in demonstration work. As a result of these demonstrations the Morbarks are finding their way into the woods as a supplement to or an alternate to the sap peeling and chemi-peeling methods which are widely used through the northern portion of the region.

LAKE STATES

Key to Survival Has Been Mechanization, Producing More Wood with Less Men

By F. N. FIXMER
Mosinee Paper Mills Co.

● Sometimes when we become discouraged with our progress in improving pulpwood production efficiency, it is refreshing to take a backward glance at conditions as they were in the past.

In September, 1946, a TAPPI meeting featured a series of papers on "Pulpwood: Stands, Procurement and Utilization" for all regions of the country. Of special interest at this time, nearly 14 years later, are some of the comments made by one Lake States observer, who shall remain nameless to save him the embarrassment of having these quotations come back to haunt him. Especially noteworthy were these remarks:

"Our average woods worker does not come easily by new ideas. This reluctance to accept anything which smacks of modernity extends to higher levels than the man who swings the axe or operates the buck saw."

"Lumberjacks in the Lake States today are a transient group, with the exception of a nucleus crew of year-round employes amounting to perhaps 15% of the total labor force."

"Power saws have not taken hold in the Lake States. . . No one has yet developed a one-man power saw . . . which will stand up under ordinary working conditions."

"Lumberjacks are not cheap today. They cost a minimum of 70¢ per hour where, in pre-war days, they cost 28¢ per hour. In addition, the output per hour has declined sharply."

Quite obviously, times have changed, bringing a new set of conditions, as well as a new assortment of problems. Our unnamed commentator could not possibly envision the average woods worker of 1960 as a family man who either lived on the job the year around, or commuted daily from a town location up to 40 miles away. Nor could that pessimist of 1946 visualize the pulpwood cutter of 1960 who

MECHANICAL ARM GRIPS stack of wood. This is 4-wheel drive self-loader.

THIS SELF-LOADER HAS BOOSTED production rates in Lake States.

now uses only the latest model power saw to fall, limb, buck into 100 in. lengths and then pile for skidding an average of 2½ to 3⅓ cords per day, with frequent instances of 4 to 5 cords per man-day under favorable conditions.

The horse was still in common use for skidding in those postwar days of power equipment shortages. Now on all but the roughest and rockiest terrain, he has almost gone the way of the hand cross-cut saw. Smaller and ever-more powerful tractors skid from a few hundred feet up to a ¾-mile, or more when necessary, at the rate of ½ to 1 hour per cord.

In this part of the logging operation, there has been perhaps more mechanization than in any other phase. A vast array of ingenious ideas have been hatched and developed by everybody in the woods, from the bull-cook to the forest engineer, in the interest of minimizing the back-breaking and sweat-dropping labor formerly necessary to move wood from the stump to the truck road.

Most of them accomplished that objective, although not always with maximum efficiency and reduced cost. The fact remains that the combination of improved dray designs, mechanical handling devices on drays and tractors, and more efficient small tractors priced within the financial abilities of the small producers have practically revolutionized the skidding of Lake States pulpwood since the days of the hand-loaded wooden dray and one-horse skidding technique.

In the matter of trucks, our nameless 1946 forecaster accurately predicted a trend toward larger and heavier units. But jammer loading, and crane-loading still required 2 or 3 men to load a truck. The "self-loader," consisting of a power-take-off, gravity boom and an A-frame, and cable combination, was a far cry from the one-man hydraulic boom and grapple loader now so common in the region.

With increased load capacities and mechanized loading, came longer hauling distance. Where 50-mile hauls were considered unusual 14 years ago, many operators now consider this an average haul, with 60-90 mile hauls fairly common to many mills which have encouraged competition with the rail carriers.

Trucking is done under such a wide variety of conditions and with so many types of equipment that it is difficult to generalize, but the averages seem to be from ⅛ to ¾ hour per cord for most hauls in the 20-40 mile range.

Probably the most accurate statement that was made by our 1946 expert was the one which warned that "No realist counts on cheaper wood as a result of mechanization. His efforts are (should be) directed toward fewer but better-trained men, each of whom will work more months (man-days) per year." Most producers who managed to get by the recessions of '53 and '58 and are continuing the struggle against higher cost and narrowing profit margins have survived only because they mechanized and produced more with fewer men. This will contine to be the goal for the pulpwood industry in the Lake States.

Locations	Species	Labor		Power Saw	Tractor	Truck		Loading
		Cds./ Man-day	Man-hrs./ Cd.	Hrs./cd.	Hrs./cd.	Hrs./cd. (One Way)		Hrs./cd.
WISCONSIN								
North Central	Jack Pine*	3.30	2.50	0.8	0.47	10-20 mi.	0.37	-
North Central	Jack Pine	3.33	2.10	0.7	0.70	15-20 mi.	0.63	0.13
Northwestern	Jack Pine*	2.80	2.30	0.8	-	10-25 mi.	0.60	-
MICHIGAN								
Upper Peninsula	Aspen	2.40	3.33	0.83	0.83	25-30 mi.	0.73	0.10
Upper Peninsula	Morbarked Aspen (plus rough Spr.-Fir)	0.82	9.75	4.0	1.00	20-25 mi.	0.80	-
MINNESOTA								
North East	Pine-Aspen-Spruce-Fir	1.40	5.71	3.0	0.50	15-20 mi.	0.38	-
North East	Pine-Aspen-Spruce-Fir	3.04	2.73	2.3	0.80	40-50 mi.	0.50	0.16

* Composite - 3 jobs

PRODUCTION RATES FOR LAKE STATES PULPWOOD OPERATIONS

YOUNG DOUGLAS FIR stand on St. Paul & Tacoma land near Lily Creek, with herringbone pattern.

VOIGHTS CREEK BURN PLANTATION a few years after planting, on St. Paul & Tacoma forest land.

WEST

Intensifies Long-Range Management of Reforested and Second-Growth Lands

By R. L. DeLONG
St. Regis Paper Co.

● Until recently the forest industries of the West have found it quite difficult to define pulpwood. In the past, our term for pulpwood has been, those coniferous species which were not utilized in the sawmills, plywood plants, stud-mills or pole yards. This situation has basically stemmed from the fact that we have been liquidating our over-mature, old-growth stands. We are now on the verge of intensive long-range forest management of our reforested and second-growth lands.

Prior to logging only for pulpwood, it was necessary to remove the mature and over-mature timber in order to obtain the acreages necessary for healthy second-growth forests. There are now substantial acreages of second-growth stands in the 50-year age classes. These acreages are now attractive to the forest industries for establishing cutting programs and management plans necessary to obtain maximum forest growth on every acre of forest land.

The West has been a leader in the recovery of pulp chips from sawmill and plywood leftovers. This program has been most successful in recovering sound wood fiber which was previously wasted. It was also a most helpful program by making it possible for the forest products industries to utilize more and more of the tree. Under a sound forest management program we should soon find ourselves approaching maximum utilization of our forest crops.

The two operators we have selected are small producers who are pulpwood logging on two experimental forests. These forests are a cooperative venture between industry and the Pacific Northwest Forest and Range Experiment Station of the U.S. Forest Service. The purpose of these experimental forests is to obtain information relative to practical thinning practices, tree planting, animal damage and other forest management problems encountered in our second-growth forests. Finding pulpwood loggers interested in thinning marked trees and cutting 8-ft. pulpwood has been difficult; however, the present contractors have been most cooperative and efficient.

Mr. Waddell's operation is from stump to market while Mr. Brazington's is from stump to roadside. Each contractor has a two-man crew and skidding is in long lengths using horses.

The Hemlock Experimental Forest is located near the Pacific Ocean in Grays Harbor County, Wash. while Voight Creek Experimental Forest is in the foothills of Mount Rainier in Pierce County, Wash. To make it even more interesting, different species are involved.

Certainly neither one of these operations is the most efficient operation in the West. How does one go about finding the perfect logging operation of any sort?

Our purpose on these experimental

LOGGER	M. S. WADDELL	DENNY BRAZINGTON
LOCATION	* Hemlock Expt. Forest Roquiam, Washington	*Voight Creek Expt. Forest Orting, Washington
SOIL CONDITION	Clay Loam	Coarse to Fine Sandy Loam
GROUND COVER	Fern and Vine Maple	Salal
PULPWOOD SPECIES & TYPE	Hemlock - 8' Rough	Douglas Fir - 8' Rough
SKIDDING LENGTH	Tree or Long Log	Tree or Long Log
AVERAGE D.B.H.	11 Inches	8-1/2 Inches
SKIDDING METHOD	Horse	Horse
AVERAGE SKIDDING DISTANCE	300 Feet	250 Feet
CUT PER ACRE	9 Cords - Thinning	7 Cords - Thinning
CUTTING AGREEMENT	Stump to Market	Stump to Roadside
CREW SIZE	2 Men	2 Men
TRUCK HAUL - ROUND TRIP	45.2 Miles	---
TOTAL CORDS PER MAN DAY	2.25 Cords	2.45 Cords
TOTAL MAN HOURS PER CORD	3.55 Hours	3.27 Hours

*Cooperative experimental forest research program with USFS Pacific Northwest Forest and Range Experiment Station and St. Regis Paper Co.

EXPERIMENTAL PULPWOOD LOGGING in Washington State. APA Western Technical Committee.

forests is to determine and establish long-term management practices. We feel that from this approach a basic thinning program will be developed. Actually, if clear cutting prevailed, logging costs would then be substantially reduced and cord production per man-day would be increased significantly.

From the experimental approach, these costs over a number of operating years reflect definite profitable management possibilities for our second growth forests.

Multiplicity of New Equipment, But Only Snail-Pace Increase in Man/Day Production

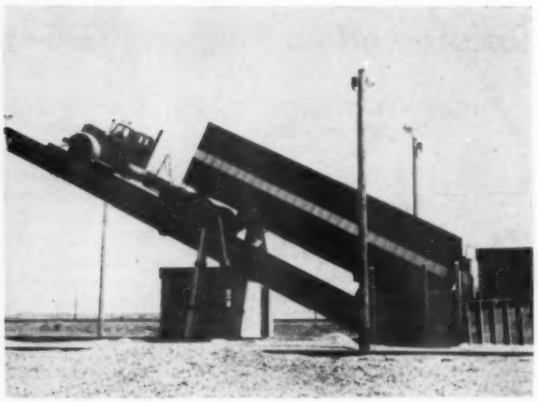
By J. S. HENSEL
APA Forest Engineer

● With the possibility of arousing the more conservative segments of our industry, I would like to make this comment. It appears that new equipment and new methods in the pulpwood industry are becoming as common and nearly as frequent as the television commercial.

Currently, we are witnessing a *multiplicity of shifting;* from stump piling to pole skidding in some areas, the reverse in others, a rather general shift from large expensive equipment to smaller and less expensive equipment, rough wood to machine peeled wood, a continuing increase in the use of mill residuals, and most important of all, a growing awareness that man-day cord production is still only increasing at a snail's pace.

For instance, a small tractor and a modified rubber-tired logging arch is used to forward stump piles in cabled bundles, to a truck road. Production by this method is good on 8-ft. wood, yet not too long ago this same operator used the same tractor and arch to skid tree lengths. Another operator uses a small crawler tractor and ground skidding tree lengths. He used to forward stump piled wood by tractor and dray to the truck road, yet now claims his operation is more efficient by skidding tree lengths. A slightly different version of the tractor and dray uses a rubber-tired skidder with an integral hy-

FOUR-WHEEL DRIVE rubber-tired skidder in new on West Coast and is low priced.



CHIP DUMPER features hydraulic lifting rams and platform with built-in scales.

CHAIN SAW GUARD adds safety feature to bucking and felling operations.

PORTABLE DEBARKER is popular in Lake States and has metal dray for forwarding.

draulic loader. A small crawler tractor provides the power for hauling and loading. Another version of this type of skidder comes equipped with Bombardier tracks.

A rather new piece of equipment recently developed on the West Coast is a 4-wheel-drive rubber-tired tractor. In the $6,000 price range it has proven in many respects, capable of good production, with low maintenance at a cost the smaller operators can afford. It is this type of productive, yet reasonably priced equipment, which our industry really needs.

A portable debarker now popular in the Lake States has a metal dray which in some areas has replaced the familiar woods-made dray. In the Lake States forwarding by dray and either horse or tractor power and loading by an A-frame jammer is still common practice, and I might add, efficient too, particularly for the part-time or occasional small farmer type of pulpwood producer.

Moving again to the West, a recently installed chip dumper features hydraulic lifting rams and platform and a built-in scales for weight determination. In addition it is equipped to efficiently unload either chip vans or open top chip rail cars which have been specially constructed for end dumping into the oversized chip hopper,

Obviously it is impossible to describe all of the new developments of the past year, however, I feel one chain-saw guard merits mention. It has been covered in a Technical Release. Currently it is being tested by one of the leading chain saw manufacturers, in view of possibly incorporating the principle with their saw.

Another significant development has been equipment which produces acceptable chips for the pulp and paper industry from planing mills. Several companies have tested and approved of the quality of chips so produced. It has also been covered in a Technical Release.

Reviewing our Technical Committee meetings, I would like to call your attention to the discussions and papers relating to the potential of mill residuals in the Lake States, the aspects of handling small pulpwood in the West, current developments in the field of purchased chips, pictorial reviews of pulpwood transport and woodyard handling in both regions and the possibilities and problems of producing chips in the woods.

Other activities have included furthering our safety flyer program, reporting on a number of state and federal legislative activities, and coping with the ever increasing correspondence asking for information and service.

In closing I would like to make one request. If at any time anyone learns of a development which affects our industry, please alert your Forest Engineer. In this way particularly the Association can continue to improve its technical service.

NORTHEAST

Integrated Logging of Sawtimber and Chemi-peeled Pulp Yields Full Returns

By G. A. PESEZ
International Paper Co.

● The pulpwood operation under discussion here is not necessarily "The Most Efficient Pulpwood Operation" in the Northeast as the title suggests, since there are several published reports of other operations which can point to a higher rate of production per man-day. However, in some respects this particular operation is unique in that two separate species of pulpwood were produced for two different mills, as well as a quantity of sawlogs.

The location of this operation is in central Hamilton County, New York, in the southern Adirondack Mountains. It forms part of International Paper's 30,000 acre Tree Farm. It is typical Adirondack hardwood type with beech, yellow birch and hard maple predominating. Red spruce and hemlock grow in mixture with the hardwoods, and spruce and balsam fir occur in the flats and on the ridges in more or less pure stands. The yellow birch and hard maple are of exceptionally good quality.

The first logging in this area was for spruce and this took place some 40 to 50 years ago. The first hardwood logs were removed during the late 1930's. Since the original hardwood logging, the area under consideration was logged at least twice more for hardwood logs, the last time as late as 1957. This was a light cut of maple, beech and ash.

As the company's Ticonderoga, N.Y. mill began to use increasing quantities of hardwood pulpwood, the decision was made to supplement purchased hardwood requirements with hardwood pulpwood produced on company lands. The need was particularly urgent for peeled hardwood to ease the burden of drum barking hardwoods thru the winter months, when rough wood drums less easily than at other periods of the year.

In the vicinity of Speculator, N. Y., the company owns about 50,000 acres of hardwood type lands, most of which had been logged at least twice for hardwood sawlogs. Although some 75 miles distant from the mill, this area represented a large reserve of hardwood pulpwood for the Ticonderoga mill. The first hardwood pulpwood in this area was cut during the summer of 1956, and since that time there have been four such operations, producing from 1500 to 3000 cords annually of hardwood and hemlock pulpwood.

As the sawlogs removed previously consisted principally of the high value species such as yellow birch, black cherry, hard maple, ash and basswood, the remaining stand had a high proportion of beech, soft maple and the poorer formed yellow birch and hard maple. Since beech and soft maple both respond extremely well to chemi-girdling, and since it was desired to produce peeled wood, it was decided to chemi-girdle the hardwoods as well as the scattering of large hemlock that occurred throughout the stand.

Prior to chemi-girdling, which is done a year ahead of the logging, the trees selected for chemi-girdling are marked by forestry personnel. Trees that will make sawlogs are marked in a distinctive manner so that they will not be chemi-girdled. All sound beech and soft maple over 8 in dbh are marked for girdling, together with other species left from the sawlog cuttings that are not suitable for sawlogs. There are three reasons for this:

(a) Beech and soft maple respond very favorably to sodium arsenite girdling.

(b) stumpage values of these two species in the area are from 1/3 to 1/5 the stumpage values for hard maple and yellow birch.

(c) It is desirable to mark enough pulpwood per acre to make the operation attractive to an operator.

Over a 4-year period this type of operation carried out on hardwood lands that have been cut over twice and in some areas three times for hardwood logs, we were still able to re-

move an average of 9½ cords of hardwood and hemlock pulpwood per acre. It should be pointed out that much of the remaining stand consisted of large size beech and hemlock, running 4-4½ trees per cord.

To do the actual logging, a local sawlog operator with experience in Adirondack logging was chosen. As hardwood pulping was new to the area, all previous pulpwood cut in the area being spruce, it was difficult to engage local labor, other than tractor and truck drivers, to produce hardwood pulpwood. To carry out the actual felling and handling of the wood, it was necessary to bring in bonded Canadians, and the first year, 1956, three complete crews of Canadians had to be engaged before any appreciable production was attained. The second year, the third Canadian crew of the previous year returned, and for the past two years local residents have comprised the entire crew.

The actual logging of this operation, which begins in April or May, is in many respects similar to that of producing sawlogs. The chemi-girdled trees are felled and limbed by the fallers and left in tree lengths for skidding by tractors to the landing. On a typical operation, several well chosen sites are selected for landings, and these vary from ¼ to ½ acre in size. Both sawlogs and pulpwood trees are ground skidded to the landings, where the chemi-girdled trees are bucked up into 4 ft. lengths, and the sawlog trees are cut into 10, 12 and 14 ft. lengths.

The hardwood pulpwood is immediately loaded by means of a truck mounted Bantam crane employing a pulpwood grapple onto trucks which carry about 7½ cords per load. Thus the wood does not have to be piled, with the exception of the hemlock pulpwood, which must be completely cleaned of bark, and which is trucked the following winter or summer for loading into box cars for consignment to the company's mill in Pennsylvania.

Tractor logging in rugged Adirondack country, under summer conditions is very hard on equipment, and this operation was no exception. Frequent and costly breakdowns of skidding tractors was common. Medium sized tractors, such as Oliver OC-12s and Allis-Chalmers HD-6, were employed. Skidding distance varied from a few hundred yards to three fourths of a mile.

During the first three operations, these tractors were used entirely to ground skid from the stump to the landings, and maintenance costs were very high. Midway thru the 1959 operation, the contractor tried out a Pettibone Mulliken Master 12 rubber-tired skidder to skid the longer distance wood. At this time, the OC-12 and HD-6 tractors were used exclusively to pre-bunch from the stump to points where the Pettibone Mulliken skidder could pick up a hitch of 2-2½ cords, and bring it to the landing. Working in this fashion, the Pettibone Mulliken skidder averaged 8 to 10 trips per day, and delivered 16 to 20 cords from the woods to the landing. Tractor maintenance costs were appreciably lowered thereby.

Personnel on this operation consisted of 11 men, including the contractor. Five of these, consisting of two fallers and three men bucking up at the landing, worked together on a piece-rate basis, while the three tractor drivers and two choker men were paid on an hourly basis.

The contractor was paid a flat sum each week until he was settled at the completion of the job. The piece workers were paid on a mill delivered scale for the peeled hardwood, and on a roadside scale for the peeled hemlock which was piled in the conventional way for later delivery. As the hardwood was delivered as fast as it was produced, the piece workers were paid on the quantities delivered weekly to the mill.

Average Weekly Output

The average weekly output of this crew delivered to Mill and to roadside, was 98.26 cords, plus an equivalent of 12.39 cords of hardwood logs, for a total weekly output of 110.65 cords.

Loading into trucks was by means of a Bantam mounted crane using a pulpwood grapple, and a truck hauling 7½ cords could be loaded in about a half hour. Trucking distance to mill was 75 miles, and therefore was a one-trip-a-day haul.

The entire job lasted 14 weeks, from the first of May thru the middle of August. The crew worked on an average of five 9-hour days per week. Total cords delivered were 1282 of peeled hardwood and 192 of peeled hemlock, plus 93,000 ft. of hardwood logs. This resulted in a production per man-day of 2.03 cords, including logs in cord equivalents. In terms of man hours per cord from stump to loading on trucks, this came to 4.42 hours. Eight tenths of a man hour were needed to mark and chemi-girdle the wood produced.

The cut per acre of logs came to 404 bd. ft. per acre, for which the company realized full stumpage returns. This income could not have been realized without a pulpwood operation on the area.

The chemi-girdling was performed by forestry students who are annually employed in crews of six to eight to perform this and other types of woods labor.

Some Advantages

Some of the advantages of this type of operation are as follows:

1. Since this is a hot logging job, it is not necessary for the company to make advances to the contractor as he is settled each week on actual deliveries to the mill or roadside.

2. It provides employment for trucks as early as mid-May, which is considered early in the Adirondacks.

3. There is no scaling (excepting for the hemlock) in the woods. Piece workers are paid on mill scale and

CHEMI-GIRDLING plus ground skidding removes 85% of bark from hardwood trees.

receive any benefit for over run.

4. Crane loading, especially of large hardwood pulpwood which average 10 in. in diameter, is quick and labor saving. Very little additional placement of the wood is needed on the trucks by the drivers.

5. Pieceworkers do not have to tier or pile the hardwood.

6. There is no breaking out, plowing or sanding of roads in winter.

7. Peeled wood is produced for what amounts to a rough wood price paid the contractor, as the chem-girdling plus ground skidding removes 85% of the bark. The cost of chemi-girdling must be considered however.

Some of the disadvantages of this type of operation are:

1. It is not always easy to obtain four to six men who are willing to split their piecework earnings evenly.

2. To get the highest type of labor, it is necessary to mechanize more fully, which means a larger investment in equipment by the contractor.

3. Tractor skidding in summer on rough ground is very hard on equipment.

Following this operation the contractor is given a contract to purchase log stumpage on the company's lands. He sells the logs produced on the open market. This enables him to employ his equipment thru the fall and winter months, as well as to hold his crew the year around.

This year it is planned to nearly double the quantity of hardwood and hemlock to be chemi-girdled in the Speculator area, and which will be produced during 1961. Each succeeding operation results in improvements in techniques and mode of equipment in this integrated type of pulpwood and log operation.

WOODEN PULPWOOD PALLET lightens pulpwood handling for small producers in Northeast.

Approach 100% Mechanization as Break-Through Nears in Stump-to-Truck Hauling

By D. A. SWAN
APA Forest Engineer

● Nothing revolutionary has taken place in the Northeast in the past year, but progress has been steady. We are rapidly approaching 100% mechanized operations of one type or another. Of course, all of our wood is cut with power saws and on most large operations all loading and unloading is mechanized, cranes with pulpwood grapples are by far the most popular method.

Horses are still moving a lot of our wood from stump to truck road. This is the only phase of operating that is not largely mechanized on most company and large contractor operations. We are, however, streamlining one phases of horse yarding by eliminating piling the wood roadside for truck loading and piling it directly into truck sized pallets (7 to 8 cords for ten wheelers), thus eliminating one handling completely and two handlings when opportunity to dump the load is present.

As far as I know, the Northeast is the first section to use these large sized pallets. Four cord and one cord pallets for bob-tailed trucks are quite common but I have not heard of anyone else putting a full load on a ten wheeler with one pallet, let alone 12 cords on semi-trailers with one pallet.

Several small operations in Maine are now using small crawler tractors, in conjunction with pallets; on yarding distances up to 1,000 feet and 20 to 30 mile truck hauls they are delivering three cords per man day from stump to mill. Use of pallets with horse yarding will give you about the production but yarding distances will be only 300 to 400 feet maximum and you will have two or three times as much truck road.

We feel that moving wood from stump to truck road is the area in which the next breakthrough will come, certainly it is the least efficient phase of operating at present. We have efficient tools for cutting, trucking and handling in being, but do not have a proven versatile tool for this first movement of wood other than the conventional crawler tractor which has its limitations, especially cost-wise.

One Canadian company has completely eliminated horses on their 300,000 cord operation by use of Bombardier tractors. Several of our companies are using Bombardiers successfully on a limited scale with varying results. I predict that the rubber tracked vehicle will replace the horse eventually and rubber-tired skidders will be used to exploit the better chances. We have a lot of terrain where our rubber tired machines available now just cannot operate successfully.

Personally, I have been an exponent for years of keeping the tree in one piece as long as possible on its trip to the mill. Mechanical yarding equipment now available to us makes it practical to deliver payloads of tree length material to truck road and this is the trend.

To touch briefly on other areas of progress in the Northeast; our chip program is supplying an increasing amount of raw material on a stable basis; weight scaling has proven highly successful at two of our mills, with two others about ready to start it; one of our large companies has the best woods safety record that I know of in the industry, a frequency of 22 for the past two years.

While we may have a few inherent disadvantages in competing with some other sections I am confident that good old Yankee ingenuity will come up with the equalizers.

SOUTHWEST

Crew Averages 2.39 Cords per Man-Day with Pallets and Tree-Length Skidding

By H. H. FLICKINGER
International Paper Co.

● There are 19 mills represented on the Southeastern Technical Committee, with an annual consumption of over 9 million cords, and covering an area from Virginia to West Florida. Fairly complete surveys have recently been made of a good part of the production in this area, and it appears that there are over 4,500 regular, and at least 2,000 part time producers employed in logging these mills.

Picking the best job, in terms of man-day production, from such a number and over so wide an area is beyond me, and I make no claim to having done so, but an operation which is well above average has been chosen and is described.

1959 Production	3,856 cords
Average Weekly Prod.	74.16 cords
Average Size Crew	6¾ men
Man-day Production	2.39 cords
Average Haul	21 miles
Average Cut per Acre	4.1 cords
Trees per Cord	12
Average Skid	600 feet

Equipment: One 2-ton truck, 6 pallets; 2 Ford tractors; 3 chain saws; 2 wheel saws.

Logging: Georgia flatwoods.

This is a pallet job, skidding tree length to a landing where the trees are bucked into 5 ft. lengths and loaded into the pallets by hand. The producer attempts to run two 3-man crews on the falling, skidding, bucking and loading. One man does the skidding, the other two falling, limbing, bucking on the landing and hand loading the pallets. Normally the two men will fall for a day or so and then buck and load on the landing. By proper organization of the two more-or-less separate logging crews, this procedure keeps the pallets loaded and the truck busy.

The producer keeps three chain saws for the two crews, so a spare is available in case of breakdown. The chain saws are traded in after falling about 600 cords to keep breakdowns to a minimum. Bucking at landing is done with wheel type saws.

The tractor driver does his own hooking and tries for 3 trees per load. The largest tree is hooked by tongs attached to the hydraulic lift on the rear of the tractor and the others with ordinary chain chokers.

There are probably a number of producers in the Southeast with better man-day production, but we have found none averaging better for long periods, and working under average stand and logging conditions. This is a small profitable operation, with comparatively simple mechanization and reasonable investment, but they are getting good production per man and per equipment dollar, indicating a good balance of equipment. All factors considered, production such as this should be readily obtainable by many more producers.

The average production per man-day for the 9 million cords produced by the 19 mills in the Southeast Technical Committee area is estimated at about 1.7 cords, or a total of 5,294,117 man-days. If this average could be raised to the 2.39 cord operation described, there would be a saving of 1,528,427 man-days or, figuring 250 man-days per year, a saving of 6,114 men. Put another way, the same amount of wood could be produced with 29% less men and, in these days of increased demand for wood and dwindling labor supply, such opportunities for saving cannot be ignored.

Outside Chip Storage Development Can Save an Estimated $3.64 Million per Year

By J. A. HOLEKAMP
APA Forest Engineer

● It can truly be said that Southern members have buckled on their thinking caps, have rolled up their sleeves, have gritted their teeth, and gone to work. The pay-off they seek is plenty of wood at a reasonable cost of production.

This encouraging action stems principally from three soul-searching questions which members have been asking themselves—questions about the way pulpwood is being produced today in the South: First, are industry members, oftentimes, too busy, too inexperienced, or even perhaps too reluctant to face up to pressing and long-recognized pulpwood production problems? Second, in terms of cold dollars and cents, what is the price paid for inaction and, at times, procrastination? Third, how little, or better yet, how much can the industry afford to invest in proper tools and brain power for research and development in the logging and utilization phases of forestry?

For as long as one can remember, Technical Committee members, logging engineers, and others have be-

OUTSIDE CHIP STORAGE is major trend in South, with estimated possible savings of $3.64 million per year.

CHIP STORAGE TEST PILE proves feasibility of outside chip storage with no appreciable fiber loss.

SAWMILL CHIPS ARE UNLOADED at a Southern paper mill. South used 2½ million cords in 1959.

moaned the lot of the pulpwood producer, have bemoaned the inadequacies of his equipment and know-how, have complained about the stumpage situation and wood inventory difficulties, and have expressed concern over a perhaps somewhat antiquated system of wood procurement. We have even cast blame on the weather and nation-wide business conditions. But only a relatively few have taken corrective steps to improve a sometimes deteriorating situation—that is, until now.

And so, times have changed, and some important things will surely grow out of these changes, because the punch that is providing the sure-fire "kick in the pants" is that of a "pinch in the pocket book."

Without question, production costs are causing some concern in certain areas. Let me cite a case in point: Using the APA Weekly Pulpwood Summary for the South as a reference, our statistician made some calculations concerning the 24 mills in the Southeast caught in a temporary wood shortage last fall.

These mills managed the production of 3.43 million cords to keep their millls running for the four months of the shortage period of September, October, November, and December. But this production was a costly matter having an estimated minimum "above normal" cost of $1.77 million dollars. Others say this estimate should be still higher. In any event, this seems a high cost to pay, and there will surely be more situations just like the one last fall, except for the fact that industry members won't let this happen again.

Last November the Southeastern Technical Committee organized a Subcommittee on Research and Work Studies. This was a significant forward step. The six-man group of serious-minded and determined men means to rally strength for combatting pulpwood production problems and improving production efficiency in their region.

Already they have initiated a rewarding fact-finding producer survey with more to follow. Additionally, they propose a Southern Pulpwood Production Research Project which calls for a substantial investment in proper tools, brain power, and facilities to help put new life into the harvesting or logging phase of forestry. With the help and cooperation of others, this project will go through and will surely see that cost control in logging and a rejuvenated technology or science of pulpwood harvesting climbs to a rightful level of attention and importance.

It is now known that wood fibre in chip form will keep safely for a number of months while fiber in roundwood form deteriorates rapidly. To gain some idea of the total dollar and cents value outside chip storage might hold for the Southern industry, the following estimate was calculated. From the APA Weekly Pulpwood Summary for the South, it was calculated that mills keep on hand an average wood supply of 19.5 days. This amounts to a standing inventory of one million cords or roughly 5% of the total annual consumption.

When making comparison with green wood, a 4 point loss of yield is to be experienced with stored roundwood. This can amount to $1.64 per cord. When applied to a million-cord standing inventory, a total of $1.64 million dollars might well be saved each year if most of the present inventory in the South is someday stored in chip rather than roundwood form. Add to this another estimated $2.00 per cord for the more efficient handling of chips vs. roundwood and the combined savings grows to 3.64 million dollars annually.

This leads up to a question. Is this potential savings attractive enough to encourage the Southern industry to make a suitable investment in proper tools, brain power, and facilities to move into outside chip storage? I think it is and, therefore, classify the outside chip storage development as quite significant.

The Southern pulpwood industry consumed close to 2⅝ million cords of chips from sawmill waste during 1959. Some members still claim an attractive production cost savings for this chip program.

If this is so, and I suspect the matter is open for debate, the chip program in the South is currently returning an estimated 10 million dollars annually. And so, two questions: First, was this a worthwhile investment in proper tools, brain power, and facilities when the program was at a point of beginning? Second, does this program serve as a reminder of the payoff possible from even a small investment in research and development in the harvesting and utilization phases of forestry? In my estimation the purchased chip program is currently a very significant development and will continue to be for many years in the future.

In conclusion, I invite your pondering these two questions: Will we do well to discard a deep-seated past belief that the industry can ill-afford to make investments in the harvesting and utilization phases of forestry? As I see it, investments in these two areas are currently yielding and will continue to yield big dividends, that is, if a share of the investments is first used to furnish the proper tools, the brain power, and the facilities for giving life to nerve centers of research and development.

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ORGANIZATION AND PROGRAM FOR 1960-61

● The American Pulpwood Association will continue to strive for improvement to pulpwood preparation, loading, and production in general during the coming year. Its long-term objectives are:

(1) To conduct the Association in such a manner that it will guide and help the pulpwood industry to obtain pulpwood at the lowest cost, the highest quality and in adequate amounts, now and for future generations.

(2) To serve the entire pulpwood industry in our national programs which are Technical, Safety and Training, Statistics, Forest Management and Legislative.

(3) To encourage all members to prepare now for the predicted increase in consumption of pulpwood to occur during the next 10 to 20 years.

Board of Directors

The work of the Association is carried out by the Staff along the lines and policies laid down by the Directors of the Association. These men were elected by the Industry Members of the Association at their Annual Meeting on February 24, 1960 in New York City.

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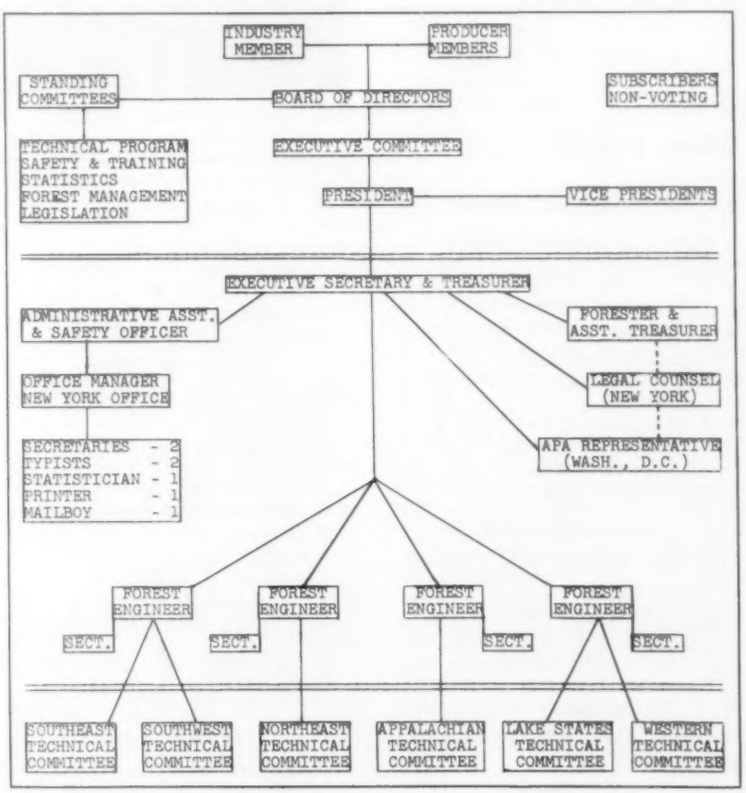

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Staff-Main Office of APA

Executive Secretary and Treasurer

W. S. BROMLEY
220 East 42nd Street
New York 17, N. Y.
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Southern Office

J. A. HOLEKAMP, *Forest Engineer*
112 N. Anniston St.
Sylacauga, Ala.
Telephone: CH 5-3103

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DONALD A. SWAN, *Forest Engineer*
533 Forest Ave.
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J. S. HENSEL, *Forest Engineer*
205½ Grand Ave.
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J. A. ALTMAN, *Forest Engineer*
2524 Hanover Ave.
Roanoke, Va.
Telephone: DI 2-2824

Advisors Counsel

DUNNINGTON, BARTHOLOW & MILLER
161 East 42nd St.
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Standing Committees are set up to function as advisory groups who study the problems and recommend solution and courses of action to the Board of Directors, Officers, and Staff, in the APA program and respective fields of interest outlined for the responsibility of each Committee, in regard to matters affecting the Association in particular and the Industry in general. The Chairman and Vice Chairman of current Standing Committees are as follows:

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L. J. KUGELMAN, *Vice Chairman*
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Between meetings of the Board of Directors, the Executive Committee, consisting of nine members of and appointed by the Board, has and may exercise all of the powers of the Board of Directors subject only to the general approval and supervision of the Board. Its responsibilities include passing on its recommendations on all questions of policy and major decisions in reference to finance matters of the Association, any questions in regard to assessments, and other financial matters, but a Budget Subcommittee may be set up each Fall to give special study and to report on this financial responsibility.

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S. K. HUDSON, *Chairman*
Container Corp. of America
Brewton, Ala.
W. M. MACCONNACHIE, *Vice Chairman*
Northwest Paper Co.
Cloquet, Minn.

Provides for the coordination of the activities of the Technical Committees of the Association when necessary. Includes the current Chairman of the Technical Committees and such other members of the Association as are designated by the Board. Provides source of advice with reference to any projects involving publications or research into the production of pulpwood or closely related fields and with general business relations between pulpwood producers and pulpwood consumers.

Safety and Training Program

C. S. HERR, *Chairman*
Brown Company
Berlin, N. H.
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New York and Pennsylvania Co.
Johnsonburg, Penna.

Coordinates and advises the Board and Officers in reference to the program and activities of the Association as it deals with training, safety, and supervision of manpower used in connection with the production and transportation of pulpwood.

Statistics Program

R. C. BARIENBROCK, *Chairman*
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Chillicothe, Ohio
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Recommends policies and advises on forms and procedures dealing with the collection, compilation, and distribution of statistics on receipts, consumption, and inventories of pulpwood.

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Calhoun, Tenn.

Makes recommendations in regard to cooperating with and furnishing aid to government agencies and others in establishing policies and in carrying out practical measures of conservation of forest resources, especially as they affect growing and harvesting of pulpwood. Its responsibilities include reference to forest economic and forest taxation problems as they come to the attention of this Association.

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Makes recommendations in regard to such actions and proceedings as may be authorized by the members of the Association, or its Board, with reference to any and all existing or proposed legislation and regulations and interpreting the same which may affect or be applicable to the pulpwood industry or any part thereof.

Technical Committees

The six regional Technical Committees are made up of representatives of members operating within the region concerned. Lists of the personnel of these Committees are provided only to Association members.

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Lake States

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Subscriptions to American Pulpwood Association material are available to those who do not qualify for membership; e.g., producers, dealers, or consumers of pulpwood outside the United States, those engaged in other forest products industries, equipment manufacturers or dealers, public foresters, forestry students, etc.

Details as to cost of membership and subscriptions are available from the Association's office at 220 East 42nd Street, New York 17, New York. Telephone: MU 7-2272.

REVIEW OF ASSOCIATION ACTIVITIES

● As we anticipate the coming decade beginning with 1960, it is interesting to look back upon the accomplishments of the American Pulpwood Association during the past ten years. APA membership in 1950 totaled 128, including 30 consuming members. At the present time the membership totals 195 including 56 consuming members representing over 80% of all pulpwood consumed in the U.S. During this same period the income of the Association has almost tripled and cash on hand and investments have more than doubled. The APA Board of Directors has increased from 25 in 1950 to 35. The APA Staff has grown from three men in 1950 to seven at the present time.

Despite the growth and accomplishments of the APA, many of the problems facing us now also faced our predecessors ten years ago. The President's report in 1949 placed particular emphasis on wage and hour problems, the problem of "employee" definition, and concern of the industry over the threat of Federal Regulation of forest practices on private lands. Our President also pointed to the serious problems concerning safety in the industry and emphasized the need for an effective safety and training program. All of these items still appear before us as major problems.

Naturally, the growth of the Association reflects the overall progress of the industry. During the ten year period mentioned above, consumption of pulpwood has increased from 20 million cords to 39 million cords. In 1949 nearly 45% was consumed by Southern mills compared to about 60% in 1959. In comparing these consumption figures, it is particularly significant to note the increasing importance of chips, wood waste and hardwoods in the overall use of wood. Hardwoods alone have increased from 2,615,000 cords in 1949 to about 6¼ million cords in 1959. At the end of the period, 1959, consumption was the highest on record.

In spite of this greatly expanded use, it is of interest to note that inventories at the end of 1959 were only slightly higher than at the end of 1949 (5,203,000 cords). Consumption of wood in 1959 was about 11% greater than 1958. One very disturbing development in the industry, however, is that even though net profits in 1959 were about 5.2% of sales, a slight increase over 1958, the net has dropped from 7.5% ten years ago.

All evidence indicates that the industry will probably continue to expand in the use of wood at about the same rate as it has during the past decade and that this tremendous expansion will present new problems, new challenges and new opportunities to all of us. Much progress has been, and is being made, in providing adequate sustained supplies of wood for the industry by using impressive quantities of what was formally wood waste materials and by better forest management, but even greater progress must be made in the years ahead.

Membership in the Association dropped somewhat during 1959, especially in the Producer class. Most of these losses resulted directly from the decline in pulpwood production during 1958. Severe economic changes affect our association about a year after they actually occur. It is hoped that the number of Producer members can be increased substantially during 1960.

The Association is still in a very strong position financially and is in good operating condition to serve its members and subscribers during the coming year as 1960 may prove to be another peak year in pulpwood consumption.

The activities of our standing committees in guiding our five major programs during 1959 are covered separately.

Technical Program

The APA Technical Program covers three major areas of activity: (1) Regional Technical Committee meetings: (2) Special action projects, usually of a technical nature, designed to help solve current production problems; and (3) Publishing of Technical Releases. Our four Forest Engineers devote a majority of their time to this program. 1959 marked the eleventh year of this particular program. During this period there has been a steady growth of activities by the various Committees.

A review of key subjects selected for coverage at each meeting of the Technical Committees reveals 1959 regional problems and areas of interest. They are as follows:

Appalachian

May—Logging Roads and Forest Service Sales.

October—Conservation Forestry Through Better Utilization.

Lake States

May—The Potential of Mill Residuals For the Pulp and Paper Industry in the Lake States.

September—A Pictorial Review of Pulpwood Transport and Woodyard Handling in the Lake States.

Northeast

June—Year 'Round Operating in the Northeast to Control Inventories, A Joint Problem for Mill and Woods Operations.

October—Transportation of Pulpwood From Stump to Truck Road (Yarding) by Various Methods.

Southeast

April—Pulpwood Production Problems and Current Developments.

November—Pulpwood Production in Southeast Region.

Southwest

April—Technical Review of Developments in Pulpwood Production.

October—Pulpwood Production Problems in Southwest Region.

Western

June—Some Aspects of Handling Small Pulpwood in the Woods. Current Developments in the Field of Purchased Chips.

December—A Pictorial Review of Pulpwood Transport and Woodyard Handling on the West Coast. The Possibilities and Problems of Producing Chips in the Woods.

An index of the papers presented at the above meetings is available to APA members from the New York Office.

In addition to the regional meetings, the various Technical Committees frequently participate in other activities for the mutual interest of members and for the benefit of the industry.

Appalachian—This Committee has made a movie on Appalachian Mill Woodyards for use by various mills in conferences on modernizing existing woodyards. This Committee, through its Public Lands Stumpage Subcommittee, has been quite active during the past year in studying problems connected with public lands. Emphasis has also been placed on company publications which are for the benefit of producers in this region.

Lake States and Western—These Committees have been working with the Forest Service, conducting a survey of the chip potential in these regions. A subcommittee has been

working with the railroads in improving rail cars for the shipment of pulpwood. Both regions now have slides available showing wood handling methods in use in the West and Lake States. The Western Committee is working on accurate and practical forms of chip measurement.

Northeast—As a result of steadily increasing insurance costs, the Safety and Training Subcommittee was extremely active during the past year. For the purpose of reaching producers and other individuals who do not attend regular Technical Committee Meetings, five Supervisory and Safety Training Meetings were held throughout the region. These meetings were very successful and a like number have been planned for 1960.

South—At the present time there is considerable interest in research in the Southeast and Southwest. Both these Technical Committees have established Research Subcommittees to consider all aspects of production and procurement. The Safety and Training Subcommittee is working with Florida mills in setting up a statewide safety program.

Technical Releases of the Association as prepared by APA Forest Engineers and others during 1959 are listed on this page.

Safety and Training Program

The Safety and Training Program of the Association has been active during the past year and it is hoped that some valuable "spade work" has been done which will result in a more effective program during the coming year. By following up some of the activities which were initiated during 1959 and carrying out the recommendations of the APA Safety and Training Committee during 1960 we should make headway toward an improved safety record for our industry.

A postcard survey during 1959 indicated considerable interest in the APA Training Guides and Worker Notebooks. In view of the interest expressed outlines for additional Guides and Notebooks have been submitted and final publication and distribution is planned for the coming year.

Several of the Regional Technical Committees have found the use of envelope Safety Flyers quite effective. The Lake States circulated a great number during 1959 and has begun distribution of a new batch in 1960. The Southeast Technical Committee has authorized their Forest Engineer to proceed with a similar program and the Northeast Technical Committee has the matter under consideration.

A most encouraging development in

APA TECHNICAL RELEASES—1959

No.	*Subject*
59-R 1	Truck Capacity Pallets
59-R 2	The "Conservator" Tree Planter
59-R 3	The "Forester" Tree Planter
59-R 4	Michigan 75 Pulpwood Logger
59-R 5	Weight Scaling in the Northeast
59-R 6	Unloading Hopper-Bottom Chip Cars
59-R 7	A Southern Tree Length Pulpwood Debarking and Chipping Plant
59-R 8	A Completely Mechanized Pulpwood Scale-Recording and Accounting System
59-R 9	Pulpwood Tractors for Wet Weather Logging
59-R 10	A Pulpwood Producer—Southeast Georgia
59-R 11	A Pulpwood Producer—Minnesota
59-R 12	For Protection Aluminum Legging Against Snake Bites
59-R 13	The Versatile Helicopter (a press release)
59-R 14	Pulpwood Management on National Forests
59-R 15	Garrett Tree Farmer
59-R 16	Nel-Spot Pack Tree Marking Gun
59-R 17	The "Goodmonson" Tree Planter
59-R 18	IBM Port-A-Punch Board and Port-A-Punch Card
59-R 19	Supervisory and Safety Training Conferences
59-R 20	Forest Fertilization—A New Era (book review)
59-R 21	"Wood Supply And Production of the Pulp Industry in the State of Washington"
59-R 22	Combination Pulpwood and Oil Tank Semi-Trailers
59-R 23	Small Portable Fire Extinguisher
59-R 24	"Timber Skidding by Tractor in the USSR"
59-R 25	"The Use of Power Saws in Forest Operations" (United Nations FAO) 3rd Report
59-R 26	Morbark Portable Debarker—A Time Study of Debarking Rates by Diameter Classes
59-R 27	Morbark Debarker—A Permanent Installation
59-R 28	Self-Unloading Trailer
59-R 29	Large Scale Pulpwood Operating with Bombardier Tractors
59-R 30	The Pulpwood "Big Stick" Loader
59-R 31	Combination Plastic Snake Bite Kit and First Aid Packet
59-R 32	Acceptable Chips from Planing Mills
59-R 33	Combination Railroad Car and Semi-Trailer-Truck Wood Chip Unloader with "On" Scale Weighing and "Off" Scale Dumping
59-R 34	Pulpwood Conveyor—Loader
59-R 35	A Chain Saw Safety Guard
59-R 36	"The Fair Labor Standards Act—How It Affects the Forest Farmer"
59-R 37	"Social Security and the Forest Farmer
59-R 37a	Comments on "Social Security and the Forest Farmer"
59-R 38	"It Is Important To Keep Records"
59-R 39	Pulpwood Truck Hoist (Progress Report #2)
59-R 40	Outside Storage of Pine Chips—Louisiana (Progress Report #2)
59-R 41	Outside Storage of Pine Chips—Texas (Progress Report #3)
59-R 42	Soil-Cement—A Possibility for Permanent Woods Roads?
59-R 43	Marketing Techniques
59-R 44	Forest Taxation in Operation
59-R 45	Morbark Log Debarker
59-R 46	Pulpwood Carload Waybill Statistics
59-R 47	M&O Chain Saw Safety Guard
59-R 48	An Incentive Plan for Tractor Operators on Pulpwood Production Jobs
59-R 49	Pulp and Paper from Bamboo
59-R 50	State Board of Registration for Foresters (State of Georgia)
59-R 51	Registered Forester Act (State of Michigan)
59-R 52	Pacific Northwest Forest Site Preparation Study
59-R 53	The Fragrance of Pine
59-R 54	A Mechanized Pulpwood Operation in Central Maine

the area of safety during 1959 was the Supervisory and Safety Training Conferences held throughout the Northeast. Over 400 men attended the five conferences which were aimed at the independent pulpwood producers and company personnel normally excluded from the Technical Committee Meetings. A similar program has been set up for the spring of 1960.

Another development indicating a real awakening to the need for an active safety program for producers is a proposed safety program for the State of Florida. The proposal provides for the hiring of a man to initiate and conduct a safety program aimed directly at the producer and his workers. Such a program, if adopted, would be directed by APA and financed by pulp mills in that state. It is hoped that this might be the forerunner for similar developments in other states.

Discussions with several insurance companies regarding workmen's compensation insurance emphasized the fact that insurance costs would continue to increase until the safety record of the industry showed adequate improvement. The association urges vigorous support for our programs as we work toward a greatly improved safety record.

Progress in improving our statistical program and broadening its coverage continued during 1959. Participation in our monthly and quarterly pulpwood reports has now increased to 194 mills, which represents about 95% of the total pulpwood consumption in the United States. The number of southern mills reporting statistics for our Weekly Pulpwood Summary have increased to 60.

The First Supplement to the Pulpwood Statistical Review, published in May 1958, was published and distributed in May of 1959. The Supplement included a summary of our monthly and quarterly pulpwood reports for 1958.

Forest Management Program

The past year brought forth considerable activity in Congress with respect to the conservation, preservation and use of natural resources affecting public and private forest lands. In addition to legislative activities the APA Forest Management program dealt with three major items: (1) The "Program for National Forests" (2) Work with the Forest Industries Council and (3) The preparation of detailed reports on the "Small Woodland Ownership" program.

Program for National Forests

Early in 1959 the Secretary of Agriculture presented to Congress a report entitled "Program for the National Forests." This report outlined long-range objectives related to the year 2000, and short-term program of the needs in the next 10 to 15 years to meet current requirements and attain the long-range objectives.

APA filed a statement with the Subcommittee on Forests of the House Agriculture Committee concurring in general with the long-range objectives of the program, with emphasis on multiple use management of the forests and other resources. It stressed the importance of forests to the pulp and paper industry; the need for more recognition of pulpwood in plans, releases and reports dealing with growth, volume, allowable cut and actual cut; the interest in access roads on Eastern as well as Western forests; and urged less comparison of "payments to counties" and inclusion of national forest expenditures for roads and fire control as a justification for federal ownership.

Forest Industries Council

In January 1960 the National Lumber Manufacturers Association presented several forest policy statements.

The Council recommended that some of these be given further consideration and action. Regarding *Wilderness and Recreation* the Council, while recognizing the importance and need for recreation in federal forests, urged that full weight be given to the basic policy under which the national forest system is managed when the establishment of wilderness areas are under consideration. The basic policy being that national forest system is "to be devoted to its most productive use for the permanent good of the whole people."

Concerning *Government Forest Land Acquisition* the Council believes that stability in private forest management, in all federal projects in which private forest lands are to be acquired by the federal government, will be promoted if the government, at the option of the private owner, would provide for their replacement through the exchange of similar and suitable federally owned forest lands of equivalent value. The Council further urged that the original owner should be given the option, after private forest lands have been taken through condemnation without replacement in kind, to harvest the forest products from the land acquired, upon payment of their fair market value.

The Forest Industries Council recommended that the Secretary of Agriculture be requested to review periodically the membership and tenure of service of individual members of the Department's *Forest Research Advisory Committee*. It was pointed out that adequate geographical representation of private forestry organizations is needed on the Advisory Committee, and that some committee members no longer hold the positions in which they served when originally appointed to the committee.

The *FIC Pest Committee* urged member associations to take prompt action in submitting statements to Senate and House Committees considering pesticide legislation, pointing out the need to study the benefits of pest control programs and the losses caused by forest pests. The Pest Committee also urged support of an intensified program in animal damage research for forest crops. The Committee also commended the research work of the Fish and Wildlife Service in this regard and recommended support of its intensification.

Small Woodland Ownership

In accordance with recommendations of the APA Forest Management Committee in 1959, a 39-page report on "Programs of the U.S. Department of Agriculture for Small Woodland Holders" was prepared and presented to the Committee. After comments were received and further study of the report was made, a tentative draft of "Industry's Recommendations for Services to Small Woodland Owners" was prepared.

This draft was submitted to the APA Board of Directors, Forest Management Committee and Legislative Committee, National Lumber Manufacturers Association and the American Paper and Pulp Association. As yet there has been no set of recommendations with which our industry is in full accord, hence coordination with the Forest Industries Council for submitting recommendations to the Secretary of Agriculture has not been completed.

Legislative Program

During the lengthy, first session, the 86th Congress was responsible for numerous legislative proposals which, if enacted, would have a direct effect upon our industry. The Legislative Committee and the APA staff maintained a close check on each proposal, making appearances before Congressional Committees or presenting statements when called for. Although the

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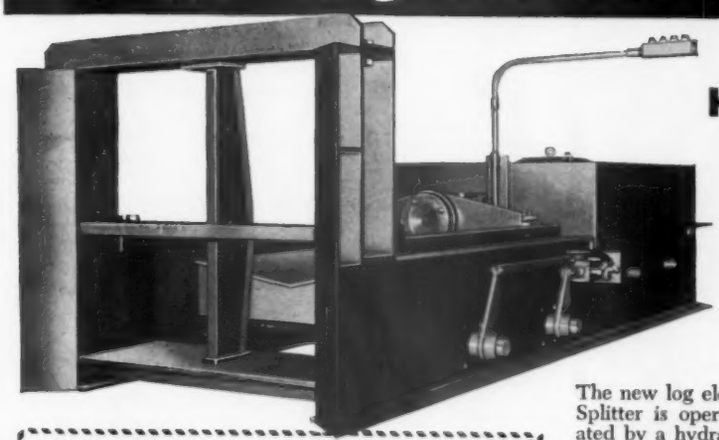

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Senate Labor Subcommittee completed its deliberations on a bill to amend the Fair Labor Standards Act, no final action was taken by the full Senate Labor Committee.

The House Labor Committee, through its Subcommittee on Labor Standards, did not hold hearings during the first session but has scheduled them for early March. The APA and other Forestry organizations are planning to appear before the House Committee in opposition to this legislation which would adversely affect the 12-man logging exemption and the seasonal exemption as well as raise the minimum wage to $1.25 per hour.

A surprising development during the first session of Congress was the passage of a strong Labor Reform (Landrum-Griffin) Bill. The APA was very active in supporting AP&PA in efforts to secure passage of this effective piece of legislation. Although there has not been sufficient time to determine the overall effect of the provisions contained in this bill there is reason to believe that it will solve many labor woes of the past.

In the field of forestry legislation, many proposals have required considerable attention. The APA has made its stand known on each of these as circumstances have dictated. Among the most urgent concerns the Resources and Conservation Act. This particular proposal was contained in a bill introduced by Senator Murray with the support of 30 other Senators. It would create a Council of Resources and Conservation Advisers with staff, and a Joint Committee on Resources and Conservation. The purpose is to develop a conservation policy, conservation planning and progress reporting for all phases of natural resource management on both public and private lands. This legislation was opposed by APA at a hearing in Washington in January.

Another item receiving considerable attention is the proposed Wilderness Preservation System. This proposal by Senator Humphrey, along with 17 other Senators, established a system composed of federally owned or controlled areas, retaining primeval environment and influence, managed for continued preservation as wilderness or serving public purposes. The basis of the system is present areas within national parks, national forests, national wildlife refuges and other public lands presently retaining the principal attributes of their primeval character. Other areas may be designated later. The proposal also includes provisions for a National Wilderness Preservation Council. APA's policy is to cooperate with organizations opposing the legislation and delay action pending release of the National Outdoor Recreation Resources Review Commission's report.

An important piece of legislation growing out of a proposal from the Assistant Secretary of Agriculture would authorize and direct that the national forests be managed under principles of multiple use and to produce a sustained yield of products and services. The legislation would materially broaden the basic concept and policy for the establishment of the national forests.

APA has been working closely with NLMA in conferences with the U.S. Forest Service on legislation concerning the granting of rights-of-way over federally owned lands if applicant agrees to grant rights-of-way to the Forest Service over the applicant's land. Further conferences with the Forest Service in an attempt to work out differences in the granting of rights-or-way and easements over government land will be arranged.

Similar legislative proposals in both the House and Senate provide for an Agricultural Research and Development Commission. The House bill, which appears to be more favorable, would create an independent agency in the Executive Branch. It would not conduct any research on its own, but would only recommend areas of research which should be initiated, expanded, redirected or terminated. Since both the House and Senate have passed these particular bills they will now have to be considered by a conference committee.

The 86th Congress has proposed numerous plans for establishing new National Parks throughout the country. Numerous hearings have already been held and others are being scheduled, generally in the areas concerned. The APA policy is not in accord with the acquisition of private and large blocks of National Forest timber producing lands for national parks except where nationally outstanding scenic areas are involved. APA urges members and others in states involved to appear and testify when possible.

As a result of hearings held by the Senate Small Business Committee on Problems of the Independent Logging and Sawmill Industry, Senate Report No. 240 was issued. The general feeling was that the report did not accurately report the information presented by the numerous witnesses appearing. The Association made a detailed analysis of all testimony presented to show that the conclusions contained in the report were not supported by the transcript. It was submitted to the Chairman of the Committee. No additional action was taken.

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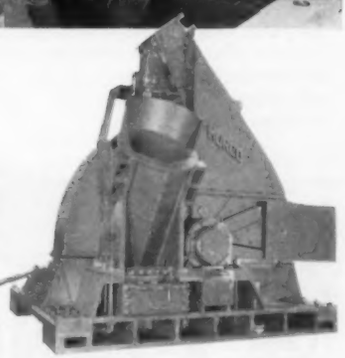

MURCO 104" 12-knife chipper with Uni-chip knife mounting, 24" "V" spout, Blower housing - disc brake, spout cover lifting device. Motor synchronous 1250 H.P. 360 RPM. Motor coupled to chipper shaft with a flexible floating type coupling ... unique design in that the coupling connection is on the end of the shaft. Installed at Tennessee River Pulp & Paper Co., Counce, Tennessee.

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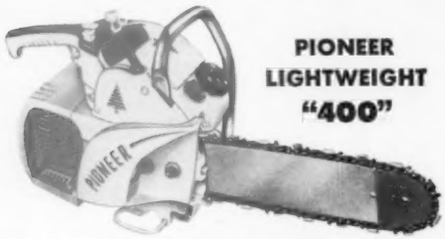

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SOLUTION: Cat 977 Traxcavator with Log Fork

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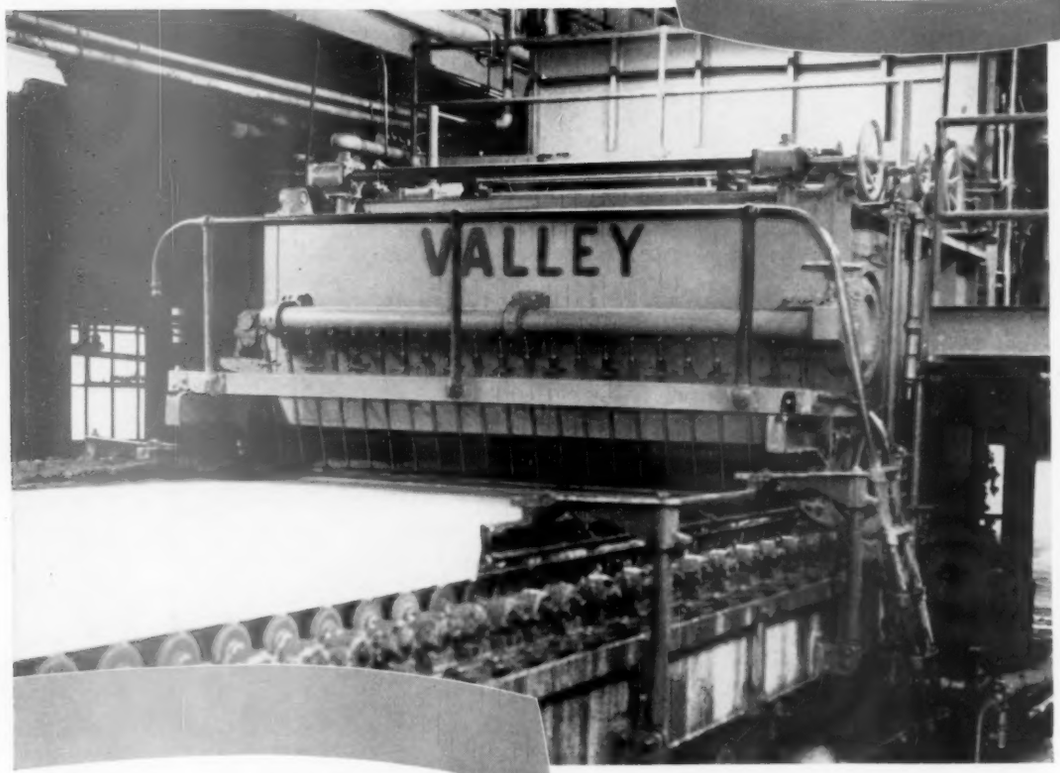

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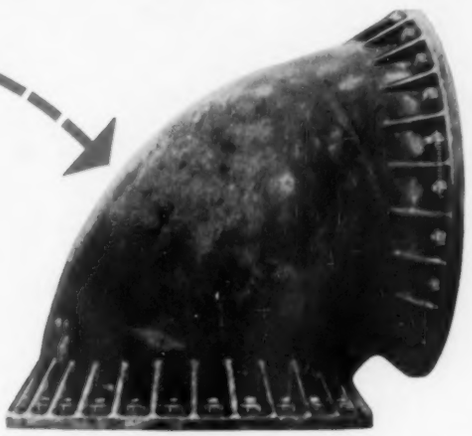

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Installed in 1945, this 30" *ESCO* Cast Alloy 43H elbow continues to give completely trouble-free service at Weyerhaeuser Timber Company's Sulphite Pulp Division at Everett, Washington.

Located between the sulphur burners and the cooling pond, the *ESCO* elbow casting handles corrosive sulphur dioxide gas at temperatures ranging from 1800° to 2000° F. This is one of two headers used alternately. Based on this successful performance, many other *ESCO* Alloy 43H castings have been installed in this operation.

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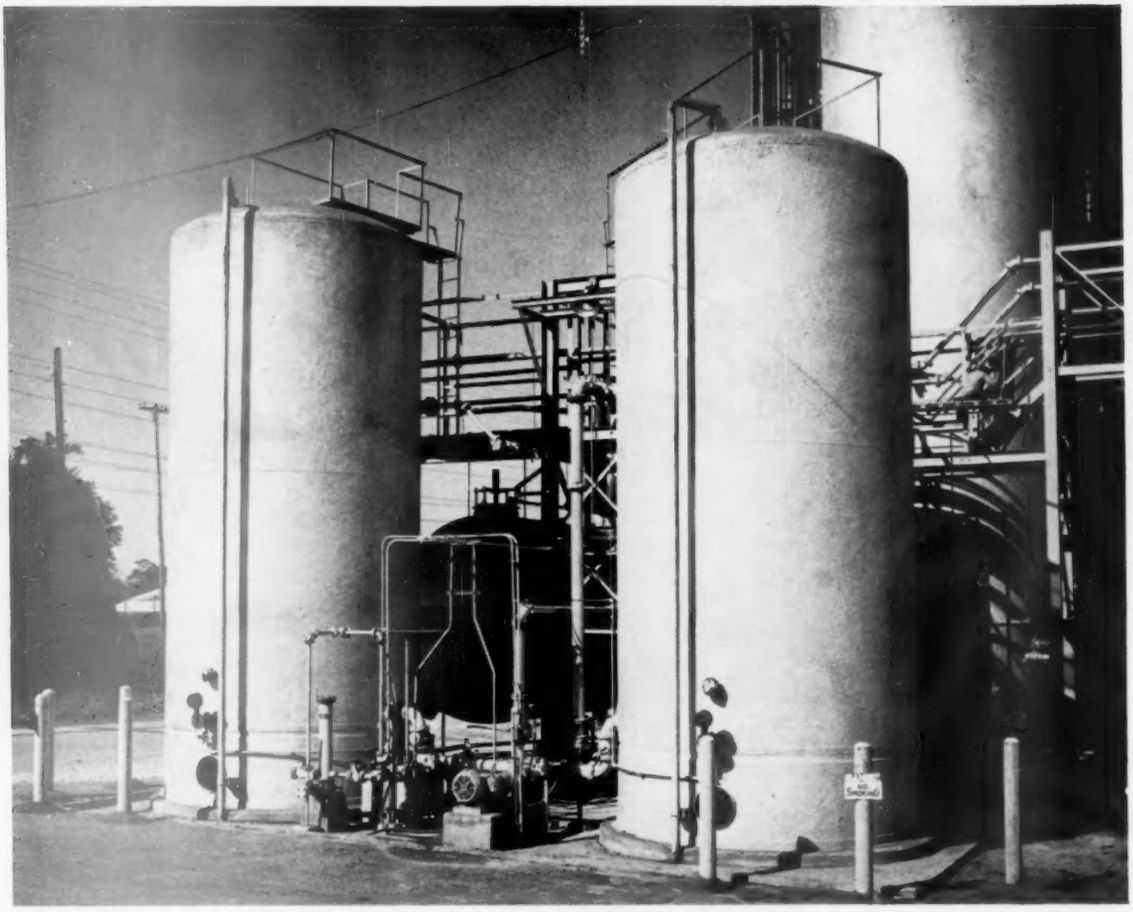

Glasteel takes the bite out of corrosive chlorine dioxide at Scott Paper Company's mill in Mobile, Alabama.

How to profitably end corrosion in every phase of ClO_2 generation

If you examined these tanks for dissolving and storing sodium chlorate, you'd find no evidence of corrosion at the constantly shifting liquid-air interface.

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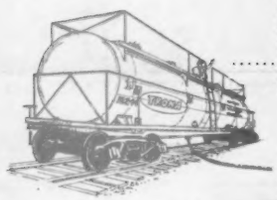

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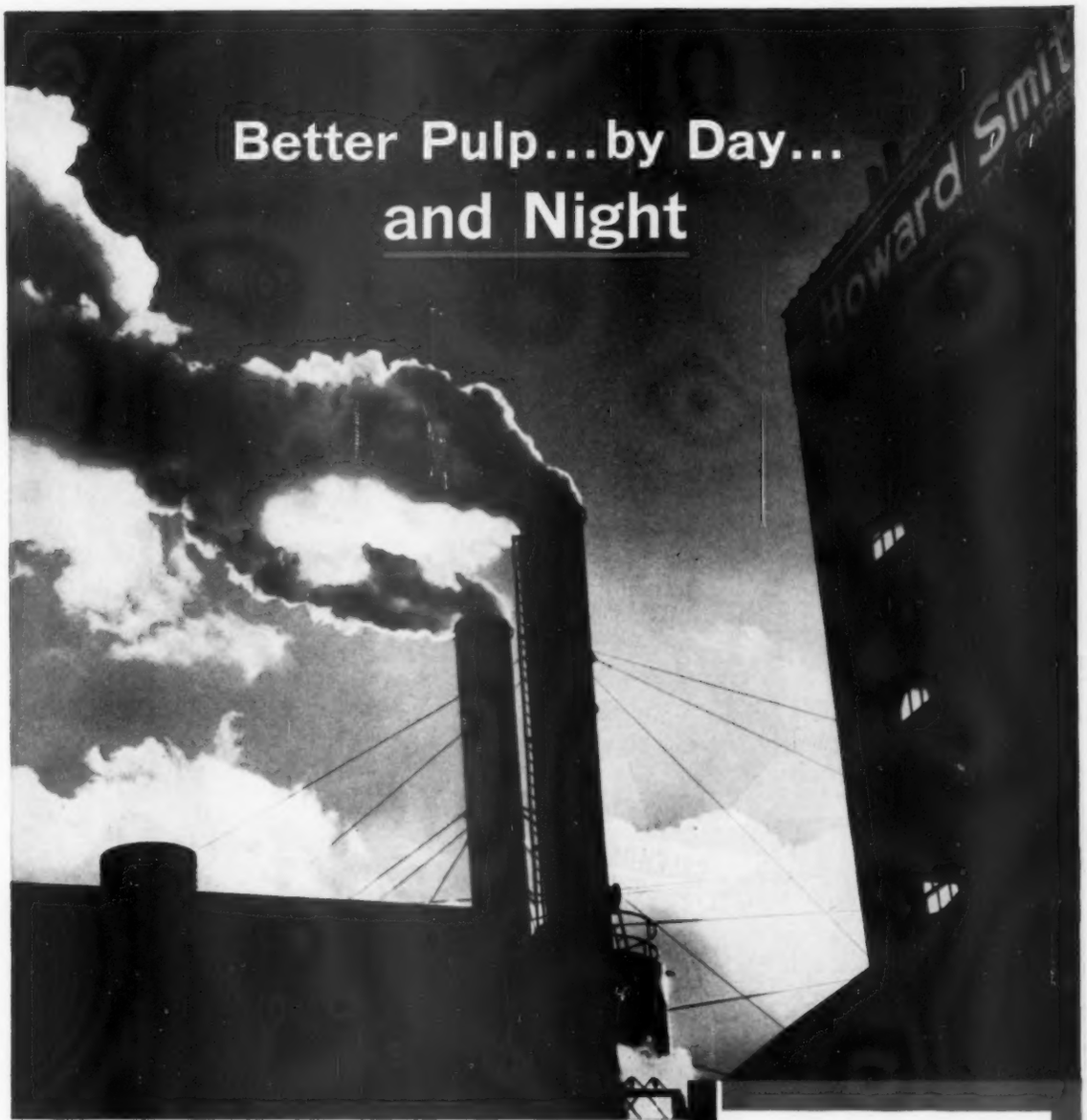

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Four B&W Boilers—two power and two recovery units—supply steam at the rate of 1,300,000 pounds per hour. The Cyclone Furnace fired power boilers burn bark, oil, coal, or natural gas alone or in combination. Each generates 450,000 pounds of steam per hour at 1275 psi and 1000 F. The recovery units are designed to process 1,170,000 pounds of black liquor solids per day and produce 202,000 pounds of steam per hour at 1275 psi and 900 F. For efficient heat recovery, they're equipped with economizers, tubular air heaters, and Venturi Evaporator-Scrubbers which reduce exit gas temperatures to 200 F.

Pine Bluff's steam generating system is another example of B&W's ability to meet the rapidly increasing steam demands of the Pulp and Paper Industry. If you're thinking of building a new mill or expanding an old one, we can provide the economical solution to your steam generation and chemical recovery problems. Just write to the Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

P-823

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BOILER DIVISION

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Strictly Personal

Midwest

Richard C. Peterson, Safety Paper div. mgr., now heads the new Research & Development dept. of Bergstrom Paper Co., Neenah, Wis.; he joined the firm in 1954 as technical director, became asst. mill supt. in 1955 and head of safety paper operations in 1957. In another Bergstrom appointment, **James D. Allen** becomes bookstock supt. He was formerly technical director. . . . Manchester Machine Co., Middletown, Ohio, names **Albert Peck** mgr. of manufacturing and **Glenn Williams** project engineer; Mr. Peck was formerly works mgr. for Aluminum Industries and Mr. Williams a plant engineer for D. M. Bare Paper Co. . . . **D. A. Forsberg,** president of Forsberg Paper Box Co., Madison, Wis., is new president of the Folding Paper Box Assn. of America.

Champion Paper & Fibre Co. reports temporary realignments in top management posts following election of **Dwight J. Thomson** as board chairman and **Karl R. Bendetsen** as president: **Leo Geiser,** formerly Ohio div. vice pres. and gen. mgr., becomes acting group executive, Operations Group; **Earl Jones,** acting Ohio div. mgr.; **Benjamin V. Wright,** finance vice pres., becomes acting group executive, Converting Products Group. Mr. Bendetsen, in addition to duties as president, is serving as exec. vice pres., Printing Products Group.

James F. Staley is named by Southworth Machine Co., Portland, Maine, as Midwest res. district mgr. for paper mill sales; he was formerly in engineering positions with West Virginia Pulp & Paper Co. and the Eastern Fine Paper & Pulp div. of Standard Packaging Corp. . . . **John W. Luce,** industrial engineer in the Glass Container div. of Owens-Illinois Glass Co., becomes asst. to **Tom W. Brown,** Multiwall Bag div. mgr.; he will direct research and new product development. . . . **Robert M. Brown,** asst. supt. of the Aetna Paper Co. div. of Howard Paper Mills Inc., becomes division safety supervisor.

A "mock arbitration board" took the spotlight at the February meeting of PIMA's Michigan div. Under the direction of **Frank Southon,** KVP-Sutherland Paper Co., board members included: **Robert A. Huston,** Fuller Mfg. Co. vice pres. and Kalamazoo labor attorney; **George O'Bea,** vice pres. United Paper Makers & Paper Workers Union, and **Burnell Long** and **Thomas Scott,** both of KVP-Sutherland.

Midland-Ross Corp. has announced retirement of two top executives: **William A. McKinley** as board chairman and **Saxton W. Fletcher** as vice chairman. . . . **Frank Kranhold,** 82, former asst. gen. supt. of Kimberly-Clark Corp., died recently in Appleton, Wis.; one of the firm's twenty 50-year men, he was a founder of the Superintendents Assn. (now PIMA). . . . **E. T. Gardner,** 80, a founder of the former Gardner Board & Carton Co., died recently at his Dayton, Ohio home; (the firm he helped establish is now the Gardner div. of Diamond National Corp.). . . . **C. I. McNair Jr.,** vice pres. for manufacturing of Northwest Paper Co., Cloquet, Minn., from 1940 until his 1953 retirement, has died following a lengthy illness; he was a son of one of the founders of the firm, with which he became associated in 1914. . . . **E. F. Collins** becomes gen. mgr. of the W. C. Ritchie div. (Chicago) of Stone Container Corp.; he was formerly marketing vice pres. and a director of Metal Edge Industries, Barrington, N. J. . . .

Paul A. Halas joins the sales staff of the Machine Knife div. of John W. Bolton & Sons Inc. and will cover the territory including Chicago, most of Illinois, Wisconsin and sections of Indiana, Minnesota and Iowa; he was formerly sales engineer in Illinois and Indiana for Solar Chicago, division of U. S. Industries. . . . **F. H. Trones** becomes Midwestern regional mgr. for Byron Jackson Pumps Inc., a subsidiary of Borg-Warner Corp.; he will be responsible for Illinois, Indiana, Iowa, Michigan, Wisconsin, Ohio, Minnesota, North and South Dakota, Kentucky and eastern Missouri. . . .

G. J. Williams, sales mgr. of the Plastics dept. since 1958, is named to the new post of asst. gen. sales mgr. of Dow Chemical Co.; **Arnold A. Butterworth,** asst. to the Plastics dept. sales mgr., succeeds Mr. Williams.

Packaging Corp. Makes Nine Management Changes

Morris

Paramore

Mull

Bayly

Mapes

Raber

Wakefield

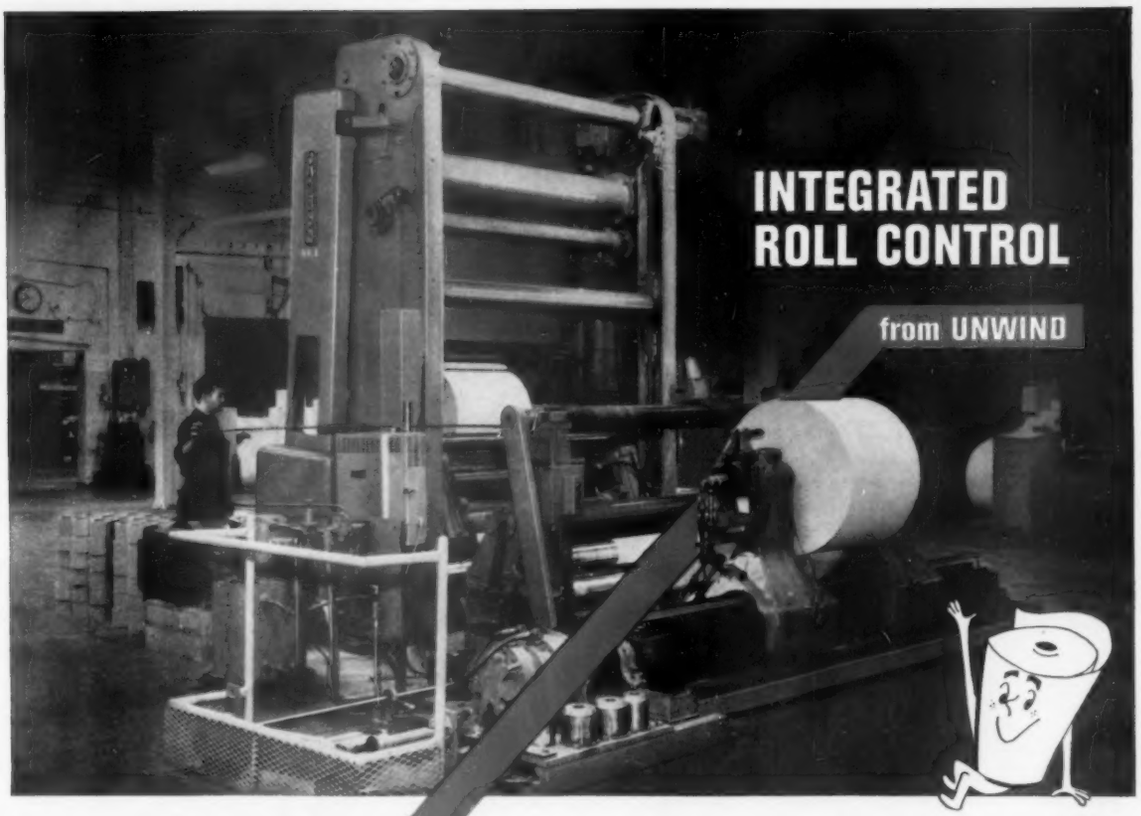
Friel

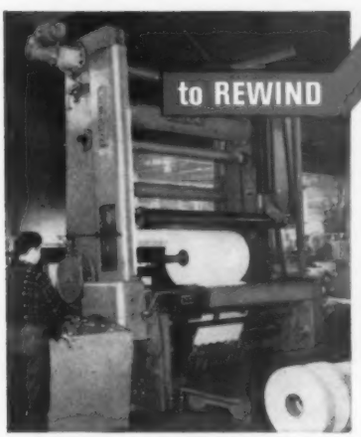
Hall

Seven-month-old Packaging Corp. of America reports a series of top-level appointments from its new corporate headquarters in Evanston, Ill. The firm was established in mid-1959 as a result of the merger of Central Fibre Products Co., Quincy, Ill.; American Box Board Co., Grand Rapids, Mich., and Ohio Boxboard Co., Rittman, Ohio. These are now major divisions of the new company.

J. C. Morris, formerly senior vice pres., Ohio Boxboard, becomes senior vice pres.; **Robert G. Paramore,** vice pres. and gen. mgr., Central Fibre Products, senior vice pres. for container operations; **Kenneth R. Mull,** vice pres., American Box Board, senior vice pres. for cotnainer sales; **G. V. Bayly,** vice pres., Ohio Boxboard, senior vice pres. for cartons; **W. Harvey Mapes Jr.,** vice pres. and exec. committee member, Central Fibre Products, senior vice pres. for molded products.

Named vice pres. for industrial relations was **Charles F. Raber,** formerly vice pres. and director of industrial relations, American Box Board; **William J. Wakefield,** director of personnel and industrial relations for Central Fibre Products, is vice pres. for traffic and transportation, procurement and reciprocal relations; **J. P. Friel,** Central Fibre Products vice pres. of traffic and transportation, is director of traffic and transportation, and **Rowland L. Hall,** director of purchases for American Box Board, becomes director of purchasing.





Cameron 450. Refinements include vibration-free main drive transmission, dynamically balanced rotating elements, belt-driven riding roll, automatic counterweighting, friction-free rewind shaft bearing holders, electric riding roll lift*, automatic roll ejector*, and many other Cameron features.
*optional

How Fraser Paper Limited gets

THE NEW ROLL

. . . the finished roll of superb quality, product of integrated roll control!

One of several Cameron integrated roll production systems serving in the Fraser mills and finishing rooms, this completely integrated 72-inch Cameron 450 rewinding system produces *The New Roll* in varying widths and diameters on stock ranging from 18-lb. waxing paper to 40-lb. bond. Unwind-to-rewind integration of *all* elements of this Cameron installation assures perfect control on every roll produced, at speeds better than 4000 fpm.

Roll control starts with a Cameron SMP-42 shaftless automatic pickup unwind equipped with two Cameron E-7 continuous duty unwind brakes. Actuating signals flash through the versatile Cameron 901 cam-controlled pneumatic web tensioning system, with electronic side-register control. Precision control is maintained right through to finished rolls on the Cameron 450, a heavy duty rewinder featuring exceptional speed and rewind capacity, easy console-operated built-in roll controls, and fast, easy set-ups with tight starts and firmly set cores.

The smooth dependability of Cameron *integrated roll control* pays off in high operating speeds and increased productivity . . . plus the superb quality of *The New Roll*.

Get The New Roll Now! To get the full story on integrated roll control write for the new free booklet "The New Roll and Cameron".

CAMERON
a team of specialists

AA-379

Cameron Machine Company, Franklin Road, Dover, N. J.
Canada: Cameron Machine Co. of Canada, Ltd., 15 Hatt St., Dundas, Ontario
France: Batignolles-Chatillon, 5 Rue De Monttessuy, Paris (7e) France
The famous TIDLAND pneumatic shafts are sold exclusively through Cameron

54 years devoted exclusively to the design and manufacture of slitting, roll winding, unwind and web control equipment.

PULP & PAPER

Strictly Personal

Six new men have joined the Research & Development div. of Champion Paper & Fibre Co.'s general office in Hamilton, Ohio: **C. P. Donofrio,** faculty member at New York Univ. College of Forestry, becomes mgr., pulp research and development; **Donald Hoes Jr.,** patent examiner with the U. S. Patent Office, patent attorney; **David Nowak,** Univ. of Michigan graduate in the field of packaging, coating dept. research engineer; **Ned Downs,** at one time in engineering for General Electric Co., associate research engineer in the engineering dept.; **George Morley,** project engineer with the Paper Machine div. of Black-Clawson Co., senior draftsman in the engineering dept. and **Robert Connaughton,** formerly a draftsman and designer for Black-Clawson, also becomes a senior draftsman in the engineering dept. . . .

Charles N. Egan, president of Shawano Paper Mills, Green Bay, Wis., is new president of the Wisconsin Paper Group, cooperative non-profit pool car shipping organization now marking its 26th anniversary; elected new vice pres. was **Vinson Krapfel,** gen. purchasing director of Consolidated Water Power & Paper Co., Wisconsin Rapids. New members named to the exec. committee were **E. F. Davis,** president of Riverside Paper Corp., Appleton, and **D. E. Ryan,** vice pres. of Edgewater Paper Co., Menasha.

Allis-Chalmers Mfg. Co. announces appointment of **Charles F. O'Riordan** as north central regional mgr. of the Industries Group; since 1956 he has managed the firm's Midwest region with headquarters in St. Louis and succeeds **M. M. York.**—Don W. Zeigler

Named Sales Representative For International Harvester

Harry T. Phelps has been appointed industrial tractor and equipment sales representative for International Harvester Co., **R. W. Dibble,** manager, farm equipment sales, announces. In this new position, Mr. Phelps will work with the company's district offices throughout the United States in promotion and sale of industrial tractors and equipment to national fleet accounts and multiple users of industrial tractors and equipment.

Thomson Bendetsen Robertson Sr.

Thomson, Bendetsen Get Top Posts at Champion

Dwight J. Thomson is named board chairman of Champion Paper & Fibre Co., Hamilton, Ohio. **Karl R. Bendetsen** becomes president.

Action was taken because of the recent death of **Reuben B. Robertson Jr.,** president and chief executive officer. Mr. Robertson was killed recently when struck by an automobile in Cincinnati.

Reuben B. Robertson Sr. has asked that he be relieved of the board chairmanship. He was immediately elected honorary chairman and will continue as a board member. Mr. Robertson Sr. served for many years as active head of the firm. The new chairman, Mr. Thomson, is a grandson of the founder of Champion Paper & Fibre. His father was president from 1935 to 1946 and his uncle, Mr. Robertson Sr., from 1946 to 1950 and from 1955 to 1957. Mr. Thomson joined the company in 1938 and was ranking vice pres. at the time of his promotion. It was in industrial relations that he rose through the executive ranks.

President Bendetsen came to Champion in 1952 following a distinguished career as lawyer, soldier and administrator. He had served the government as Asst. Sec. of the Army, Under Sec. of the Army and chairman of the board of Panama Canal Co. Prior to government service, he had been a Washington State attorney. With Champion, he had been vice pres. and gen. mgr. of the Pasadena, Texas mill and most recently was exec. vice pres. of the firm's operations group.

Gardner Div. Changes

Manufacturing promotions for the Diamond National Corp. subsidiary include: ANDREW J. WESTENDORF, from supt. to gen. supt. at the Lockland, Ohio board mill; CHARLES S. SWEITZER, from asst. technical director, board mill development, to Lockland supt.; CHARLES E. HANNA, from asst. supt. to supt., Lockland retail box plant; GORDON L. ADAMS, from board mill technician to chemical engineer in the Middletown research and development dept.; KENNETH TENCH, from retail box plant supt. to product development specialist, and RONALD E. BABCOCK, a graduate of Carnegie Institute of Technology, becomes electrical product engineer.

WEMCO® the INCREDIBLE Torque-Flow pump

PUMPED!

Bailing wire, rags, bottles—even tin cans. The incredible Wemco Torque-Flow Pump handles any material with ease. Clogging is a thing of the past because of Wemco's recessed impeller, continuous, open passage. What will go in will come out. Send your pumping problem to the men of Wemco . . . today!

reason: recessed impeller; continuous open passage (what will go in will come out)

WEMCO® a division of Western Machinery Company 650 Fifth St., San Francisco, Calif.

"MAINTENANCE?"
"NONE!"

reports the Mead Corporation about its Westinghouse AVR adjustable-speed drives

"Not a minute's maintenance time has been required by our Westinghouse static-powered adjustable-speed drives," reports Mr. C. H. Reno, Electrical Foreman of Mead's Escanaba, Michigan, Division.

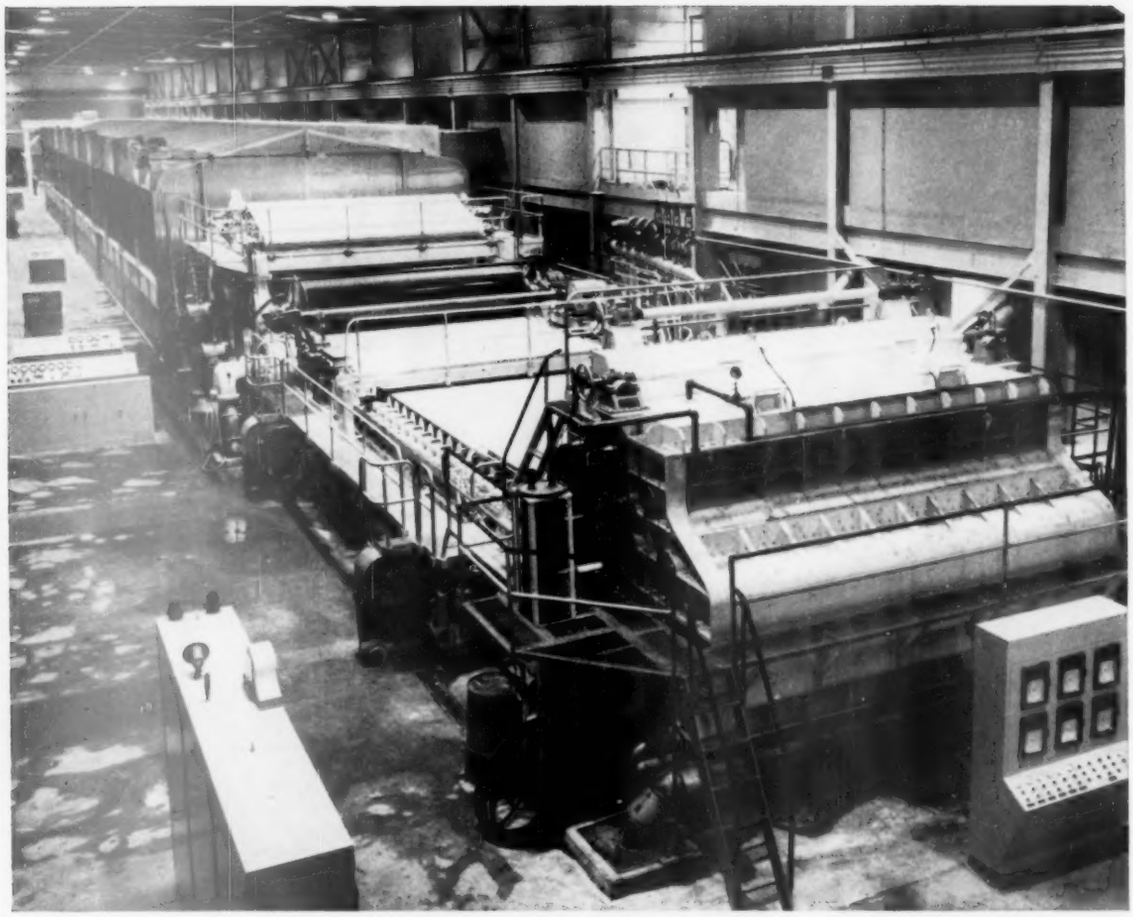
Operating 24 hours per day, Westinghouse AVR drives are used at Escanaba to drive constant displacement pumps moving color mixture to the coating process. "On this important operation," continues Mr. Reno, "any stoppage or failure would prove very costly. We must have complete reliability."

Westinghouse AVR drives save in other ways, too. They take up only one-half the production floor space required by conventional motor-generator drives. And, because they're much lighter in weight, Westinghouse AVR drives are easier to install and don't require heavy-duty concrete bases.

How about your plant? Couldn't you benefit from these same savings? Ask your nearby Westinghouse salesman to give you all the facts. Available for use with motors 1 to 200 hp, constant torque over an 8 to 1 speed range . . . or with constant hp speed ranges . . . completely static . . . no moving parts to weaken from wear and fail. J-22153

YOU CAN BE SURE... IF IT'S Westinghouse

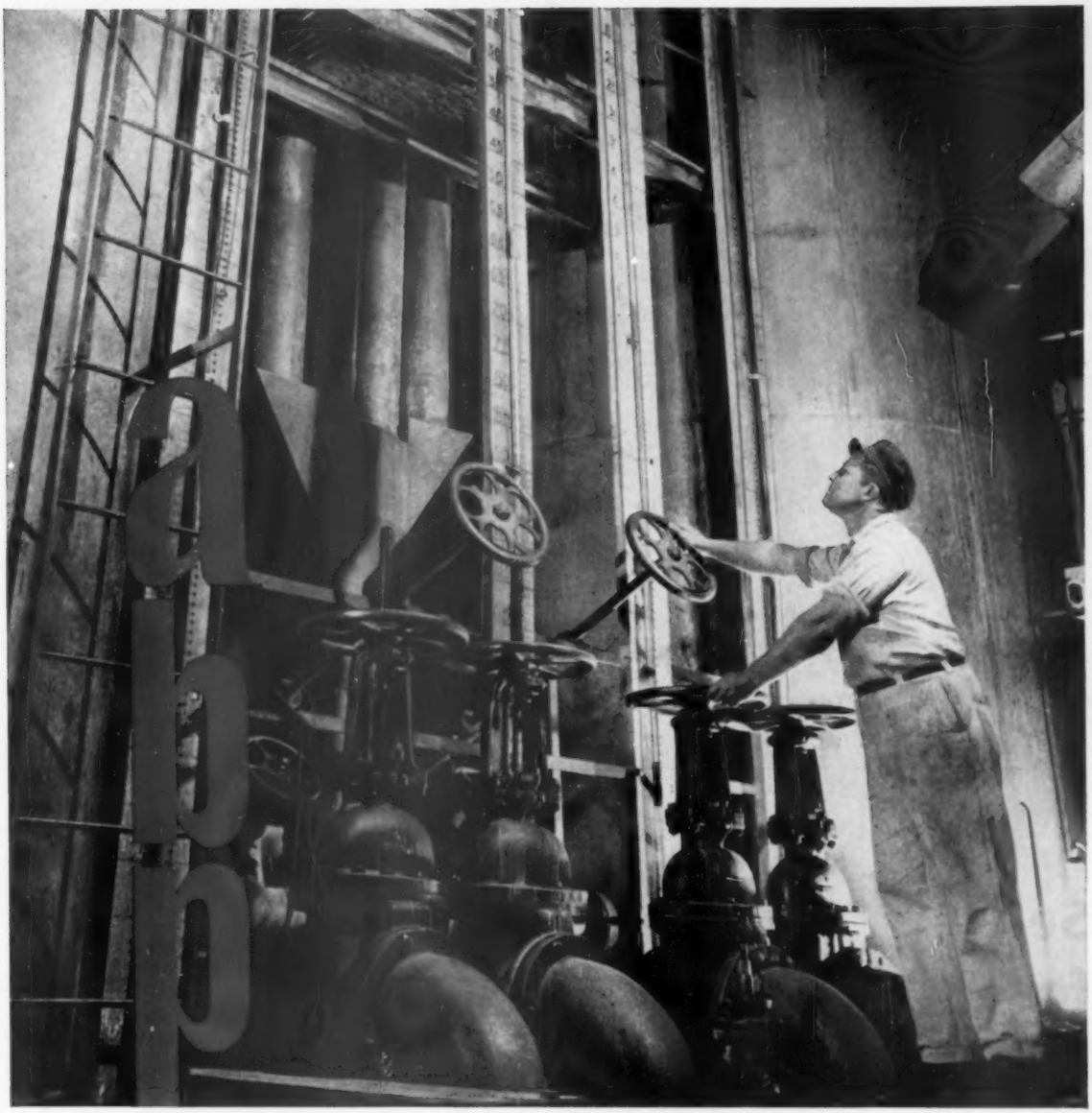
WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV ALTERNATE FRIDAYS



#6 Fine Paper Machine
at Howard Smith-Cornwall was
built by Dominion Engineering and
installed in record time.

It incorporates many
new design features.

PAPER DIVISION
DOMINION ENGINEERING
COMPANY LIMITED
MONTREAL • TORONTO • VANCOUVER



offers

you . . . increased pulp output, lower production costs

Ammonium Bisulfite Pulping is the key to increased profits for many mills. The process is easily adopted with a surprisingly small capital investment.

ABP offers a number of attractive advantages over the calcium-base process: Shorter cooking time; 20% increase in digester output; greater yields; better penetration permitting a wider choice of woods.

Substantial savings are also possible through elimination of "liming up" problems. What's more, liquid anhydrous ammonia is easily piped from tank cars . . . reducing unloading time and labor.

Get in touch with Allied Chemical . . . pioneer of this efficient process. We will gladly work with you to help put this profitable system into operation at *your* mill.

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For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475-482 and in Chemical Week Buyers Guide, pages 37-44.

PULP & PAPER

Strictly Personal

Southern

The Southern Exposure: Important promotions have been announced by International Paper Co.'s Southern Kraft div. **Guy Babin** has been named gen. asst. to the division paper mill coordinator and will transfer to Mobile, Ala., from the company's Louisiana mill in Bastrop; he has been with IP since 1939. **B. Hanlon Ingram** is now asst. group leader in the Mobile research dept., coming from his former position as quality control supervisor at Natchez, Miss. **John Puhr,** development engineer at Natchez, has been promoted to quality control supervisor of the Mobile Mill. **J. M. Ros, Jr.,** onetime asst. to the Southern Kraft div. electrical engineer, has been named first asst. plant engineer. **Francis Wakefield,** graduate of the Univ. of the South at Suwanee, Tenn., and member of IP's staff since 1955, has been named research project leader at the Mobile mill.

Palmer Kvale, a native of Minnesota and graduate of the Univ. of Minnesota, has joined the Bowater Board staff as hardboard mill supt. . . . **W. L. (Jack) Jackson Jr.,** mgr. of the Carolina and Virginia territory for Ohio Knife Co., has been named southern regional mgr.; his territory includes Virginia, N. Carolina, Georgia, Florida, Alabama, Tennessee, Arkansas, Louisiana, Mississippi and Texas. . . . Two men well known in the pulp and paper industry died in the tragic crash of the Capital airliner near Holdcraft, Va., recently. **James W. O'Connell,** 42, asst. sales mgr. of Dixie Bearings Inc., Atlanta, and **William Marsh,** 50, who represented the Electronics Products div. of RCA out of Atlanta, were both victims of the crash.

W. J. Tomalonis Jr. of Charleston, S.C., has been named development engineer at the North Charleston plant of West Virginia Pulp & Paper Co. . . . **W. C. (Bill) Gallagher,** 1937 graduate of New York State College of Forestry and a former member of the Reichhold Chemicals staff in Australia, has been named southern mgr. for the paper industry by A. E. Staley Mfg. Co. . . . East Texas Pulp & Paper Co. now boasts an all-weather landing strip 3,000 ft. long for the convenience of its flying customers.

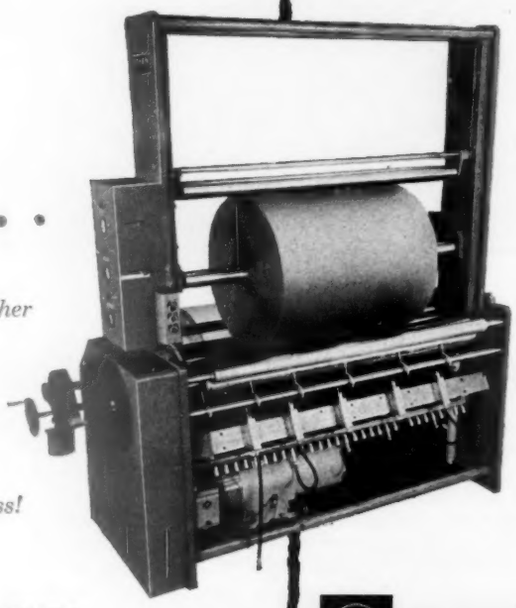
Lawrence G. Brown in New Post for Union Bag-Camp

He is named to the recently created position of director of research and development. Mr. Brown was formerly with Nashua Corp. and at one time on the staff of Scott Paper Co.

Jack Warner, president and chairman of the board of Gulf States Paper Corp., is due a round of applause after being named "Management Man of the Year" by the Alabama Council of the National Management Assn. **Harry Clark** has joined the staff of Crossett Co.'s *Forest Echoes* magazine as editor. He is also asst. to **Ramon Greenwood,** Crossett public relations director. Also new on the Crossett staff: **Robert F. Holcomb,** who has joined Crossett Chemical Co. . . .

Sells for less . . .

. . . . than any other surface rewinder in its performance class!



DOVEN
TWO DRUM REWINDER

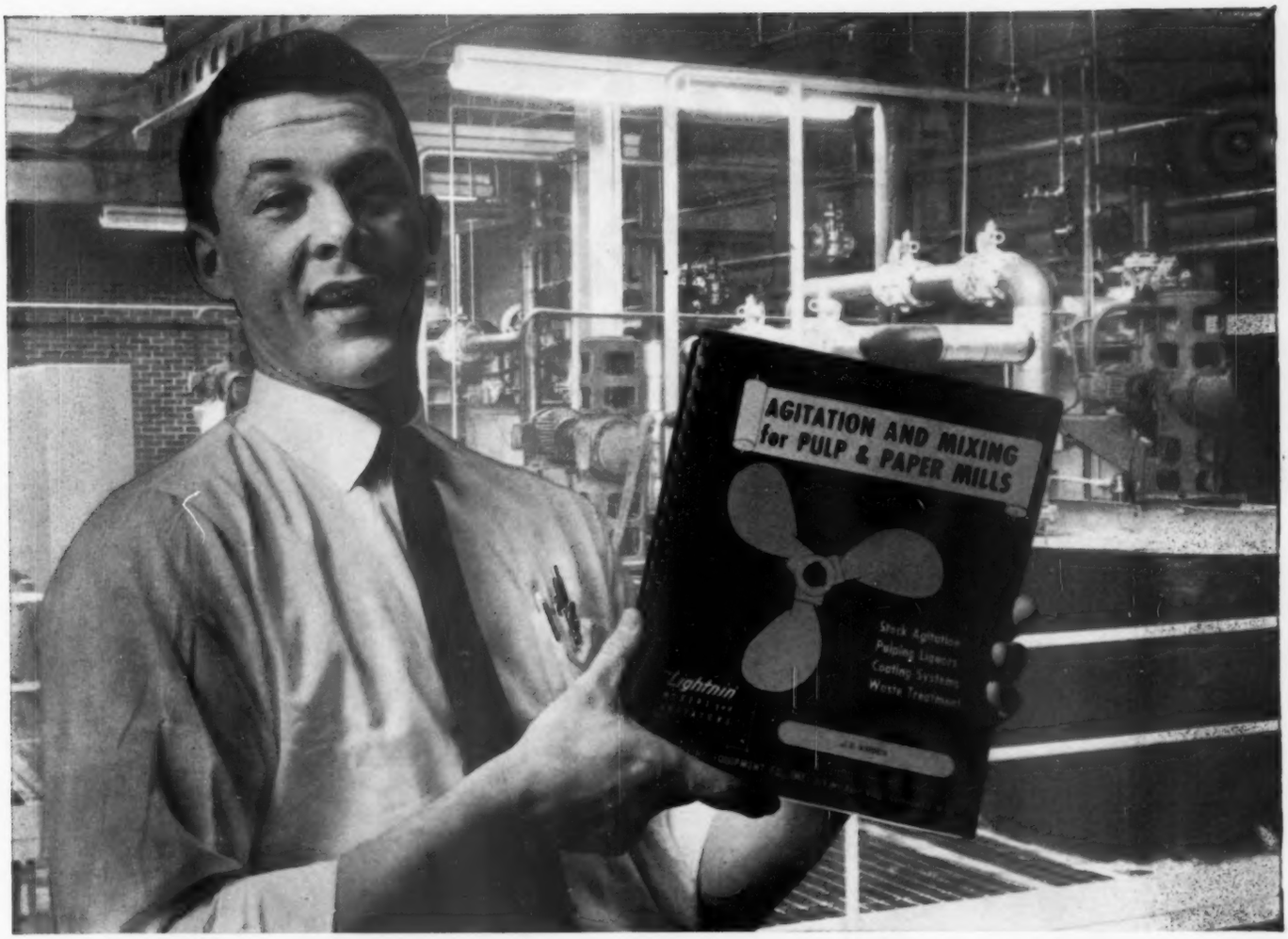
• What's more, the Doven SR-60 two drum rewinder features powered feed rolls for "tacky" webs . . . A DOVEN EXCLUSIVE. Handles waxed, gummed or plain paper, paperboard, textile or rubber material to minimum of ½" slit. Furnished with score or shear slitters. Rider roll pneumatically raised and lowered.

Web sizes from 36" to 72"; takes parent rolls to 40" diameter. Optionals include parent roll capacity to 60" dia., choice of special backstand or unwind equipment, electric or mechanical drives.

Send us details of your application and samples for complete specifications and prices.

DOVEN DIVISION

APPLETON MACHINE COMPANY
APPLETON, WISCONSIN



Getting the results you want from agitated chests and tanks is the subject of this new 112-page manual.

Complete, factual, informative, it is the first book of its kind ever written for pulp and paper engineers. It is based on ten years of unique research into the technology of mixing and agitation in the pulp and paper industry, and on hundreds of mill installations, many of which it describes and illustrates.

Anyone in the industry whose work involves agitation or mixing can get a copy free and without obligation by writing to us on his company letterhead.

Here is a partial list of the contents

PAPER STOCK AGITATION. Defining process results, complete uniformity in stock chests, complete motion, controlled zone agitation, side-entering agitators, stock consistency and power requirement, impeller selection, consistency control in continuous systems, performance and design of paper stock mixers.

Case examples. Machine chests, storage chests, blending and mixing chests, mixing boxes.

High-density storage, bleaching, blow pits and blow tanks, couch pits, repulpers.

PULPING LIQUORS. Fluid dynamics: blending, heat transfer, solids suspension, dissolving, gas-liquid operations, liquid-liquid contacting.

Case examples. Green liquor storage, salt cake dissolving, bleach liquors, lime storage, bleach liquor storage, smelt dissolvers, sulfur melters, waste neutralization and oxidation.

COATING SYSTEMS. Clay makeup, clay storage, starch cooking and storage, coating storage, dye solution tank, coating blender.

EQUIPMENT DESIGN. Basic design factors, basic mixer components, materials of construction, vertical installations, horizontal installations.

Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 141 Mt. Read Blvd., Rochester 3, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.

SIMONDS

T-18 Chipper Knives

Chips aren't bruised and "beat-up" . . . they're not mashed and of uneven length . . . when they come out from under a Simonds T-18 Knife. But they *are* uniform in size, and that means they "cook" more quickly and evenly . . . make better-grade pulp.

Make sure you aren't losing money in your wood room. Equip all your chippers with these extra-tough knives of special Simonds T-18 Steel. They hold their cutting edge . . . hold your chip-output up and your sawdust-loss down.

Check your dealer today.

Your nearby SIMONDS DISTRIBUTOR is your most dependable cutting tool supply source. His stocks and services are designed with your convenience and economy in mind. Call him FIRST for all your industrial supply needs!

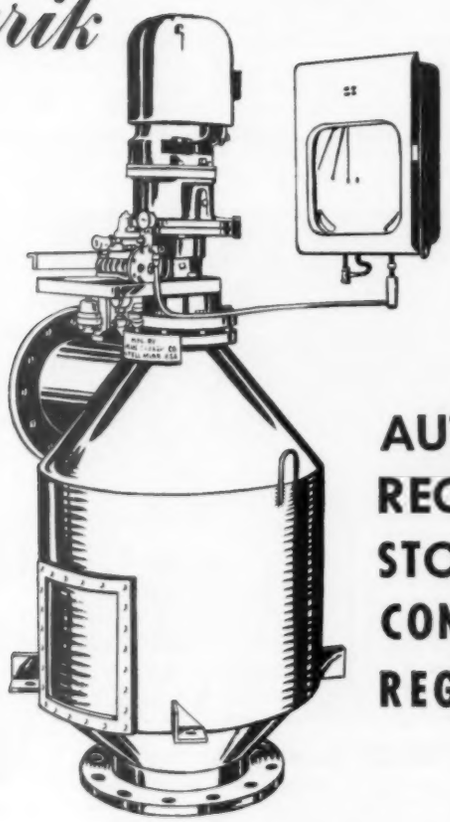
INDUSTRIAL DISTRIBUTORS — THE RIGHT HAND OF PRODUCTION

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASSACHUSETTS

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N.Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

DeZurik



AUTOMATIC RECORDING STOCK CONSISTENCY REGULATORS

Guaranteed to hold consistencies within limits of plus or minus .1%, many DeZurik Consistency Regulators, installed directly ahead of paper machines are holding consistencies to plus or minus .02%! Accuracy like this can be yours on a wide range of tonnages and installations.

DeZurik Consistency Regulators are available in three basic types: Pipe Line type (illustrated), Pan type and Open type. Write for details.

DeZURIK CORPORATION
SARTELL, MINNESOTA

PULP & PAPER

Strictly Personal

Clyde J. Pate, formerly an engineer with the Texas div. of Champion Paper & Fibre Co., is now felt salesman for the southwestern territory of Huyck Felt Co. . . . **James H. Maddox** has joined the staff of Eastern Engineering Co., Atlanta, as process piping design supervisor; he was a member of the Grinnell staff for 23 years before joining Eastern . . . **J. E. Carroll**, graduate of Georgia Tech, has been named sales mgr. of Continental Conveyor & Equipment Co., Birmingham, Ala. . . . **Marcus D. Haney**, with the Charlotte, N. C. office since 1927, is new asst. mgr. of the southern district office of E. I. du Pont de Nemours & Co.'s Dyes & Chemicals div. In Atlanta, **J. J. Barnhardt Jr.** is sales and technical supervisor for dyes; **J. H. Stradley**, technical consultant for dyes. At Charlotte, **J. V. Killheffer** becomes technical supervisor for dyes; **N. R. Vieira**, technical consultant for dyes. . . . **David M. Fix** has been assigned as technical sales representative in the South Atlantic region for Union Carbide Plastics Co. (division of Union Carbide Corp.).—W. F. Diehl

Announcing A NEW INDUSTRIAL LABORATORY FOR THE INVESTIGATION OF THE GASEOUS (AIR) DRYING OF MATERIALS

Serving THE PAPER INDUSTRY Determine The Best Coating and Method

•

Serving CHEMICALS AND PLASTICS Determine The Bulk-Drying and Heating Conditions

Three Pilot Lines

LINE 1 A Universal 3-Zone Conveyerized Oven — Interchangeable air projection plates above and below — Temperature 70-600° — Low and high velocity 400-10,000 ft. per min. — 24" wide conveyor with wide range drive — All zones individually retractable from conveyor line — Steam injection for humidity control all zones — Zoned horizontally as well as vertically.

Purpose: Drying and curing of wet material — Coated webs, coated objects, plastics, impregnated webs, etc. — Arranged for quick determinations on all products by the "Miniaturized" sample car method.

Preceded by: Coater, impregnating tanks and squeeze rolls.

LINE 2 Two Zone Dryer, Heater or Cooler for Particulate Matter (pelletized material — chopped material — crystals). Works by aerating a bed of material on belt conveyor — Velocity range 1000-10,000 ft. per min. — Temperature 45°-600° — Arranged for separation of fines — 12" wide belt conveyor.

Purpose: Drying, heating, cooling of particles of material.

Preceded by: Feeder or pelletizer.

LINE 3 Super Speed High Velocity 4-Zone Arch Dryer for Coated Web Material — Carries 24" web on rolls or belt — Velocity 400-12,000 ft. per min. — Temperature 70-600°F — Proved drying capacity (clay latex) 2800 ft. per min.

Purpose: Proving coatings and coating methods.

Preceded by: Coaters by different manufacturers.

Plus — Precision Batch Dryer — Basis Weight Scales, Thermocouples, Thermometer, Mixing Equipment, Etc.

Write for terms and advance reservation. Please include description of product and scope of investigation required. Clients are not expected to be customers of our other divisions. Reports and samples are the exclusive property of the client.

TAKING THE MYSTERY OUT OF DRYING
WOLVERINE
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31 MAIN ST., CAMBRIDGE 42, MASS.

JETZONE LABORATORY DIV.

A LEADER IN HIGH VELOCITY DRYING SINCE 1946

Brodnax Named To New Riegel Carolina Post

Henry R. Brodnax is new paper mill supt. at the Carolina div. of Riegel Paper Corp. He replaces **B. C. Moore**, who resigned to join another company. Before joining Riegel in 1958, Mr. Brodnax had widespread experience with Potlatch Forests Inc. and International Paper Co. **E. A. Henry** assumes Mr. Brodnax's former position as asst. paper supt.

Shoudy

Verross

Named to Key Posts at West Virginia Mill

Charles A. (Chig) Shoudy, associated with West Virginia Pulp & Paper Co. since 1939, is new asst. mgr. of the Charleston, S. C. mill. **William J. Verross**, formerly of Covington, Va., has been named Charleston gen. supt. of operations. Mr. Shoudy will serve as technical advisor to the division mgr.; Mr. Verross will be in charge of the finishing room, off-machine operations, paper and pulp mills, recovery and power depts.

Northeast

William R. "Bill" Willets, asst. sales. mgr., technical service laboratories i/c paper section, Titanium Pigment Corp., has been elected to the governing board of the American Institute of Physics. . . . **John E. Maxson**, secretary and sales mgr., Stebbins Engineering and Mfg. Co., has been elected executive vice president.

100- or 150-lb. cylinders with I. C. C. approved valves or one-ton containers in 6, 8 or 10-ton lots on special trucks.

by truck

100- or 150-lb. cylinders; one-ton containers in 15-ton multi-unit tank cars; single-unit tank cars.

by rail

get liquid chlorine your way

It's the handling and shipping and technical skills that make the big difference in *liquid chlorine.* Diamond is not only one of the largest producers, but delivers chlorine the way that makes you glad you said, "Diamond." Where you want it . . . when you want it . . . as you want it.

Barges with capacity of 600 tons, on America's principal inland waterways, bring big users lowest possible shipping costs.

by waterway*

*From plants at Muscle Shoals and Houston

Learn more about getting *liquid chlorine your* way. Send for the "Diamond Chlorine Handbook." Diamond Alkali Company, 300 Union Commerce Bldg., Cleveland 14, Ohio.

Diamond Chemicals

another VersaTILE installation

completed for the pulp & paper industry

36' x 55' HIGH-DENSITY STORAGE TANK

at THE MEAD CORPORATION CHILLICOTHE, OHIO

Reflected here is skill and true "pride of workmanship" —typical of S & E erection crews. This is your assurance of a low-maintenance installation on every S & E contract.

Each VersaTILE lining, tank, chest and silo is custom designed to meet the specific requirements of its service. VersaTILE are lustrous-glazed ceramic tile made from S & E dies to meet rigid specifications.

Include VersaTILE *in your Bidder's List*

Steel and concrete tanks can also be made corrosion-resistant and contamination-free with a VersaTILE lining.

SINGLE RESPONSIBILITY CONTRACTS . . . *anywhere in the world.*

Representatives: Longview, Wash. • Vancouver, B.C.

SERVICE & ERECTION CO.

1673A Washington Road Pittsburgh 28, Pa.

Designers and Builders of VersaTILE Linings and Tanks

Chas. M. Koon, Resident Mgr. at Brewer, Maine

His appointment by the Eastern Fine Paper & Pulp div. of Standard Packaging Corp. follows on the heels of recent promotion to production mgr. Announcement was made by **Frank A. Knight,** division mgr.

Mr. Koon joined Eastern in 1958 as technical director. Prior to that he had been technical service supervisor for Oxford Paper Co., Rumford; research associate at the Institute of Paper Chemistry and technical supt. for Munising Paper Co.

Other Brewer mill promotions include: **Eldridge G. Stone** to paper production mgr.; **Paul R. Coughlin,** paper mill supt.; **Eben M. Whitcomb Jr.,** control supt.; **David R. Bernhardt,** technical supt.; **John R. Tardiff,** chief inspector; **Richard L. Crommett,** asst. making supt.; **Merritt J. Hayden,** asst. finishing supt.; **Jenness M. Buck,** paper maintenance engineer, and **Robert P. Tapley,** cost accountant.

John J. "Jack" Egan, Richard A. Boss and **Ernst Wendt** has joined the Cel-Fibe division of Personal Products Corp. in executive duties in production and marketing.

Smith Gilbert

Crocker, Burbank Papers Ups Two in Production Planning

Currier Smith becomes mgr. of production planning. He was at one time a salesman for converting paper and later was named asst. to **Arthur L. Bull,** whom he now succeeds. Mr. Bull retired December 31.

At the same time, **Ronald F. Gilbert** was made asst. mgr. of production planning. He was formerly schedule mgr. for both coated and uncoated book paper grades.

ClO_2

GASPESIA NOW HAS CHLORINE DIOXIDE PULP!

Don't commit yourself on future orders for sulphite pulp until you've tried the *new* Gaspesia Chlorine Dioxide pulp.

This high-quality new ClO_2 pulp is now being produced in a bleach plant only six years in operation. Space was left for this Chlorine Dioxide operation in the original plant plans. Now, Gaspesia is the only North American sulphite pulp made from northeastern woods bleached in a completely modern bleach plant, utilizing chlorine dioxide.

Gaspesia pulps have long been known for their excellent cleanliness, strength and good forming qualities. Now chlorine dioxide makes possible a brightness of 91 G.E.

Orders for trial cars are now being accepted. We suggest you order your initial shipment today to assure a steady supply in the years ahead.

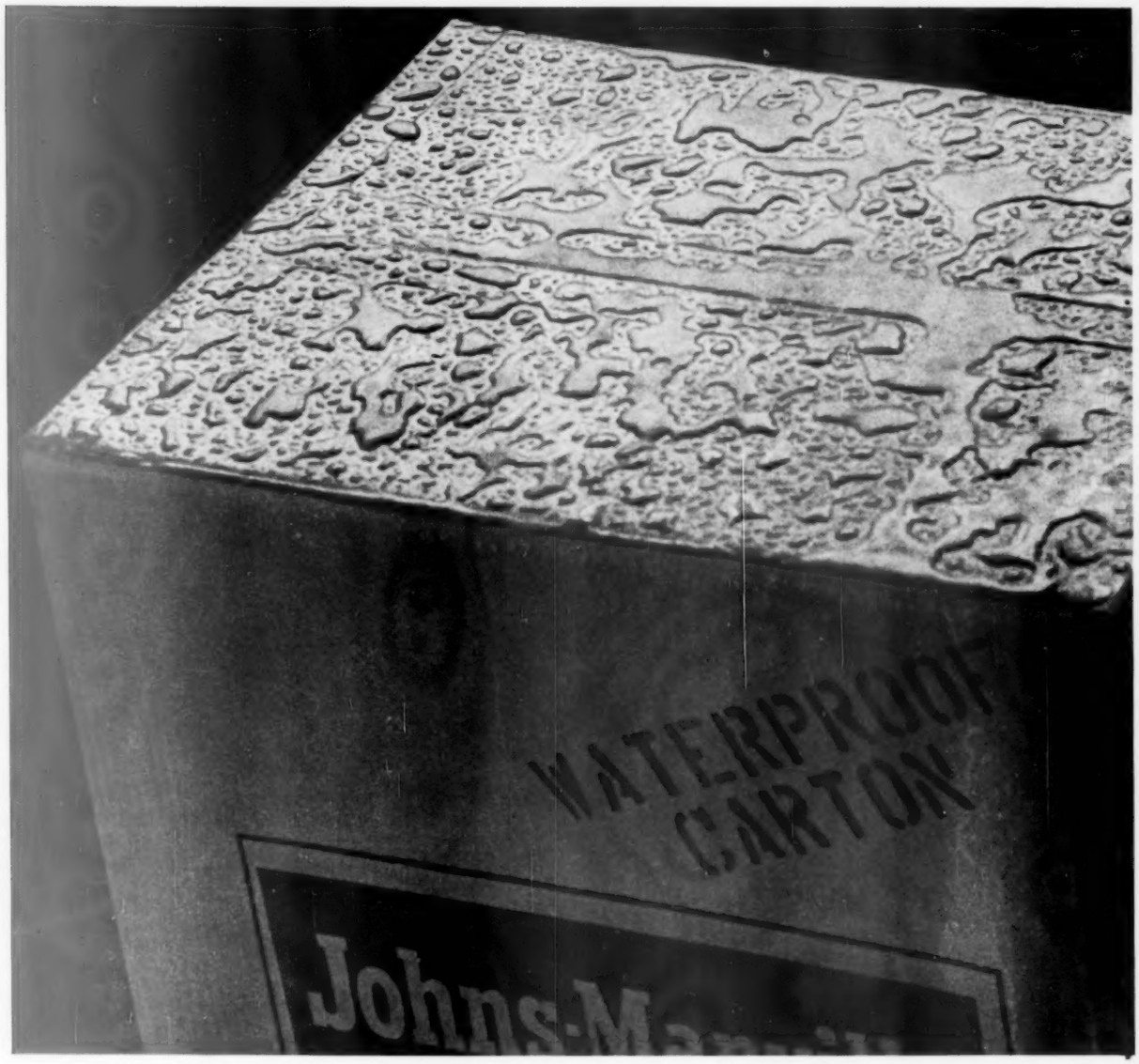
GASPESIA SULPHITE COMPANY LTD.
CHANDLER, QUEBEC, CANADA

SOLD BY: **Anglo Paper Products, Ltd.**
2055 Peel Street, Montreal 2, Quebec

SALES REPRESENTATIVES IN THE UNITED STATES:
Northeastern Paper Sales, Inc.
400 Madison Avenue, New York 17, N.Y.
20 North Wacker Drive, Chicago 6, Ill.

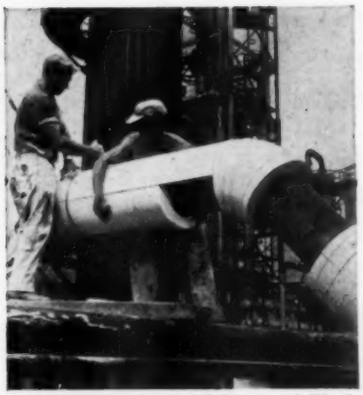
ANOTHER FIRST FROM JOHNS-MANVILLE

Industrial insulations in weatherproof cartons!



All these dollar-saving advantages for pennies more!

- **NO SHEDS TO BUILD**
- **NO HEAVY TARPAULINS TO HANDLE**
- **WEATHERPROOF FOR A MINIMUM OF 3 MONTHS**
- **SAVE TIME, WORK, MONEY ON THE JOB**

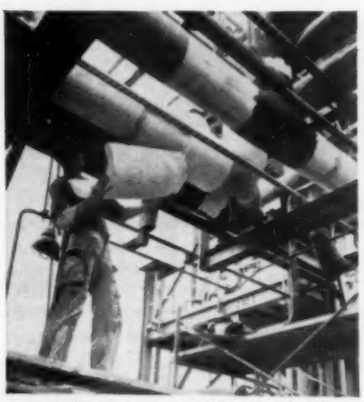


J-M THERMOBESTOS® Pipe and Block Insulation for temperatures to 1200 F., light in weight, top mechanical strength, low *k* factor.

J-M SUPEREX® Block Insulation is furnished in flat or curved blocks, and is recommended for equipment operating at temperatures up to 1900 F.

Now, thanks to a new and exclusive Johns-Manville carton, you can do away with on-the-job-site storage problems. Never mind the snow and rain. Just put the cartons on runners or skids—*and forget about weather problems.*

These cartons are proved by actual test to withstand rain and snow up to three full months! No need for sheds, lean-tos, tarpaulins or other protection. For only a slight premium, you save time—work—money. And only Johns-Manville offers you this plus value. Ask your J-M Insulation Contract Unit or your nearest J-M sales office.



J-M 85% MAGNESIA Pipe and Block Insulation is designed for use up to 600 F. on heated piping and equipment. The standard for decades.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

AN INSULATION FOR EVERY COMMERCIAL AND INDUSTRIAL USE

PULP & PAPER

Strictly Personal

Howard J. Geraghty is now asst. to **Walter Meditz**, group v.p. of Standard Packaging Corp. i/c converting and packaging operations. . . . **Ralph E. Herzler Jr.** becomes division manager of Johnston Foil.

Tuure Tenander steps up as vice president i/c sales, converting papers, for Crocker, Burbank Papers Inc. . . . **Malcolm McVickar**, becomes vice president, i/c sales of duplicating papers.

Robert Nivison 80, former v.p. of Hollingsworth & Whitney Paper Co., died March 9. He was a retired manager of mills of H&W division of Scott Paper.

James K. Gardner Jr., is now marketing manager of Lodding Engineering Corp. . . . **Lawrence A. Graham** is president and treasurer of Shawmut Waxed Paper Corp. **D. Tom Kerns**, asst. treas. and John O'Shea, New England representative.

William D. Duryea II
Sales Manager for Penobscot

Mr. Duryea succeeds his father in full charge of selling and purchasing. **William D. Duryea Sr.** retires as vice president i/c sales and purchases, continues as a director. He has been with PCF since 1921 in sales, became a v.p. i/c sales in 1943, has been a director since 1934. Mr. W. D. Duryea II is a Tufts College graduate, served with the Marines before joining PCF.

Joseph A. Clapp Jr. has joined PCF's sales staff after association with Tileston & Hollingsworth Co., a PCF subsidiary.

Barry T. Leithead, president, Cluett, Peabody & Co., is now a director of West Virginia Pulp and Paper Co. **John A. Luke**, manager of West Virginia's fine papers div., was also elected a director. . . . **Douglas J. Kramm** is now lime and chemical kiln sales engineer, Traylor Enginering and Mfg. Co. division of the Fuller Co.

Thomas B. Applewhite has been named manager of conveyor products sales, U.S. Rubber Co. . . . **Jack A. Perry** is now technical sales service engineer, Dilts Div., The Black-Clawson Co. He was previously with Weyerhaeuser Co. conducting development working in size press and coating formulations. Other experience includes Crown Zellerbach Corp., Monsanto Chemical Co. and Huyck Felt Co.

William F. Nye, N. E.
Mgr. for Hubinger

"Bill" Nye has been with Hubinger since 1948 as general line salesman, will now confine sales to paper mills. **Roy Underwood**, bulk sales mgr., announced promotion.

On Time:
When Wanted!

Dependability is more than a virtue. It's often the difference between profit and loss. Albany Felt takes special pride in the long history of its efficient delivery service. Albany Felts *always* arrive when wanted. As a result, not a single paper machine depending on Albany ever had to shut down. In safe, rugged shipping cartons (or packaged to your specifications)—Albany Felts *always* arrive when you want them to arrive. It's just another feature of *Albany's First Class service.*

Engineering Service
Laboratory Service
Research Service
} *Available to You Without Cost!*

Talk it over with your Albany Felt Sales Engineer

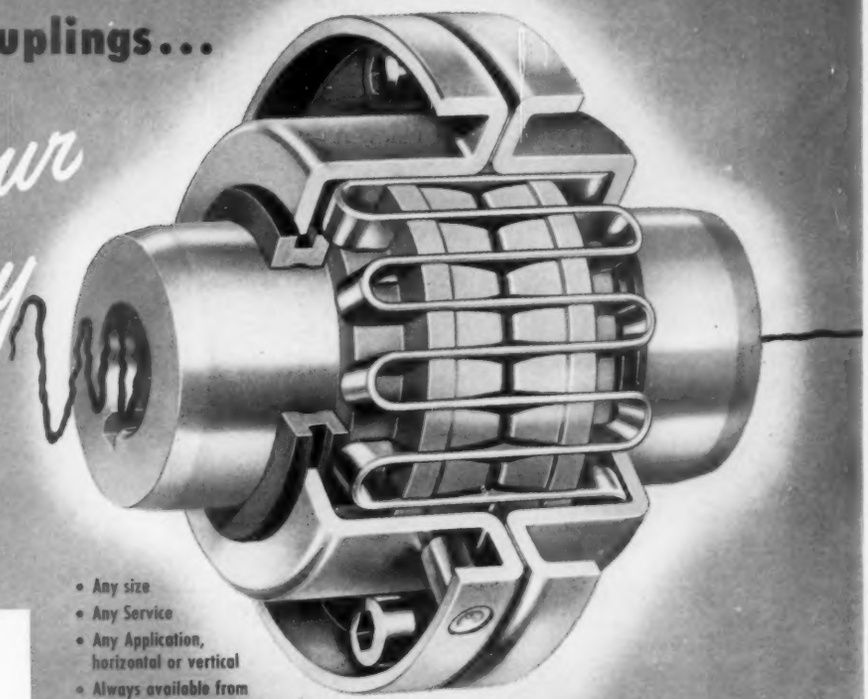
AF

ALBANY FELT COMPANY
ALBANY, N. Y.

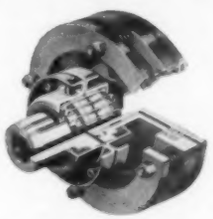
World's Largest Manufacturers of Paper Machine Felts

Falk Steelflex Couplings...

Protect your machinery in 2 ways



- Any size
- Any Service
- Any Application, horizontal or vertical
- Always available from factory, field or distributor stocks



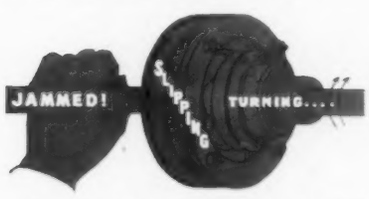
FALK and STEELFLEX are registered trademarks

Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance... are easy to install, lubricate and disconnect... and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

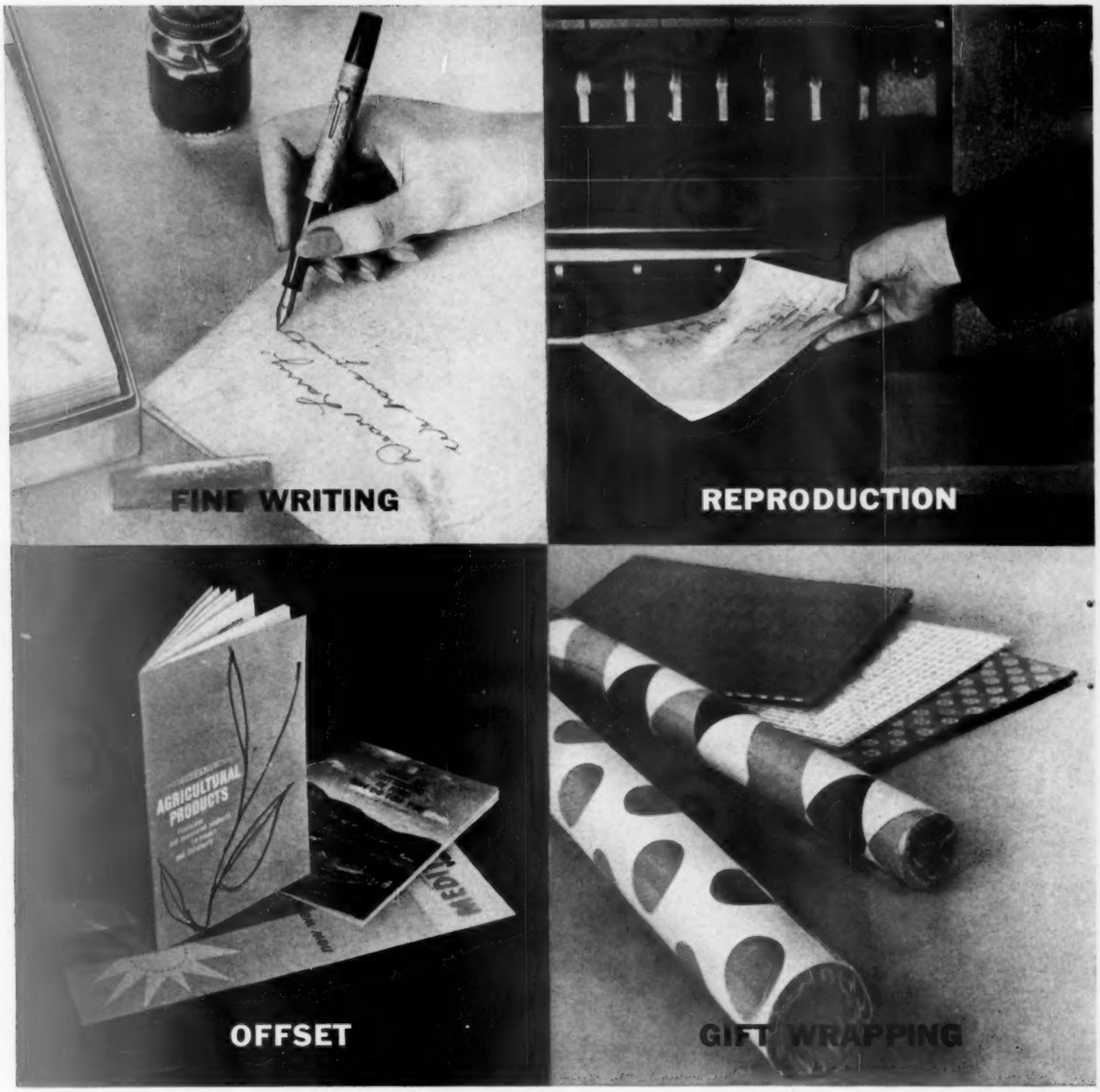
THE FALK CORPORATION, MILWAUKEE, WISCONSIN

FALK

...a good name in industry

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining



Eight papers . . . improved by a

Name your paper—and Alberta HI-BRITE Pulp will help you make it better! Now proved in more than one hundred North American paper mills, Hi-Brite is truly the modern pulp for modern, quality papers.

Why does Hi-Brite do so much more than ordinary pulps? *First*, it's produced exclusively from northern spruce and lodgepole pine. *Second*, Hi-Brite pulp is "cold-blown" from Kamyr continuous digesters to preserve the bonding strength of the long, thin fibers. *Third*, Hi-Brite's ultra-modern bleaching process actually improves the inherent strength of the unbleached fibers.

Hi-Brite . . . and Hi-Brite alone . . . has this

single pulp–Alberta Hi-Brite®!

unique combination! The result–a uniform pulp of gleaming whiteness with outstanding bonding properties!

Get the full story on Alberta Hi-Brite Bleached Sulphate Pulp... and the advantages it offers your paper-making operation. St. Regis Paper Company, 150 East 42nd Street, New York 17, N. Y.

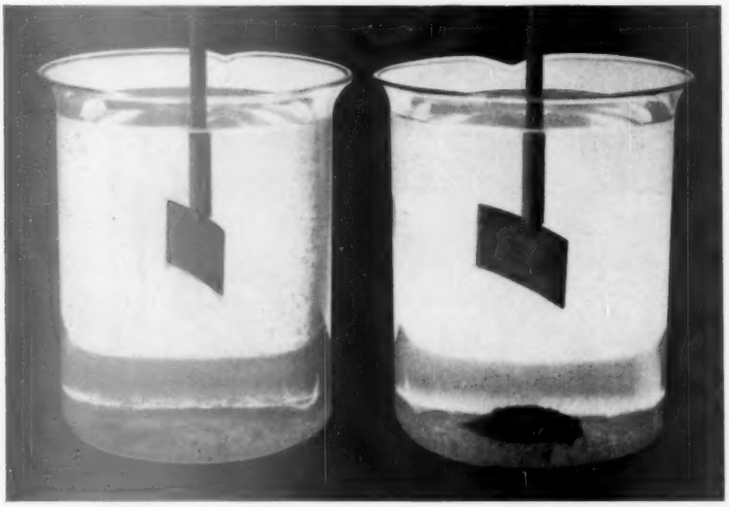
KRAFT DIVISION

St.Regis PAPER COMPANY

Send today for your Coagulant Aids Bulletin HSP-919

HAGAN COAGULANT AIDS

Faster coagulation . . . larger floc . . . increased throughput . . .



River water with Coagulants
Only 50% of floc settled in 3 minutes

River water with Coagulants plus Hagan Aid
99% of floc settled in 3 minutes

Scientifically formulated Hagan Coagulant Aids 2, 7, 11 and 18 are most effective means of improving coagulation in all types of clarification equipment, and are completely safe for drinking waters.

Supplied in free-flowing granular form, they are easy to use since they may be dry fed or readily prepared as slurries. While Aid No. 2 is a pure polyelectrolyte, Aids 7, 11 and 18 are intimate blends of: (1) polyelectrolyte to promote rapid floc growth and (2) processed clays to serve as nuclei around which floc forms readily. They also provide weight to increase the settling rate of the floc. One of the Hagan Coagulant Aids will meet your specific water condition.

In over three years of use in water clarification, Hagan Coagulant Aids have increased clarifier throughput rates, reduced floc carryover, simplified clarifier operation, improved color removal and even reduced overall chemical treatment costs in many plants.

We shall be glad to conduct coagulation studies to determine which of the several Hagan Coagulant Aids is best for your particular operation. For information, write:

HAGAN
CHEMICALS & CONTROLS, INC.
HAGAN CENTER, PITTSBURGH 30, PA.

HAGAN DIVISIONS: CALGON CO.-HALL LABORATORIES-BRUNER CORP.

Guest Stiles

Brown Promotes Two

Karl M. Guest steps into new post of manager, kraft pulp and paper manufacturing, with responsibility for all Brown Co.'s operations of kraft pulp mill and Riverside paper mills. His previous experience includes Gulf States Paper Corp., Union Bag, National Container.

Thomas J. Stiles moves from general supt. of Cascade mill to manager of paper manufacturing, replacing **Frederick E. Macy**, who has resigned. His responsibility includes all paper manufacturing in Riverside and Cascade paper mills.

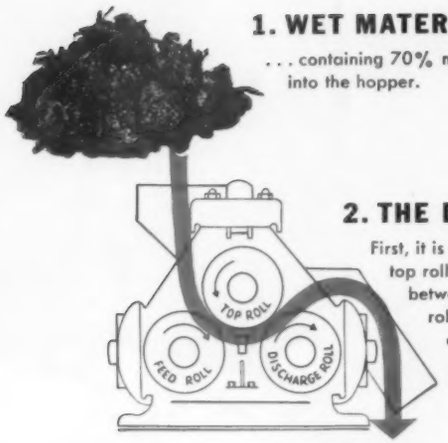
Charles William Howarth, president, Columbia Box Board Mills, Inc., died March 26. He had been active in the paperboard industry for 45 years. **Henry M. Greenhouse** has been named asst. to the executive vice pres., Columbia Box Board. . . . **George V. Rittenhouse** is now district manager, industrial sales div., Virginia Smelting Co. . . . **Aubrey T. Taylor** has joined The H. K. Ferguson Co. as asst. director, pulp and paper div. **William T. Webster** is the division director.

The Frank Marchetti's (Titanium Pigment) very happy over their first born, **Maria Donatella.**—Maurice R. Castagne.

Sheridan J. McNamara Joins Huyck Felt Co.

He becomes a fluids mechanics engineer in the Rensselaer, N. Y. company's Development dept. Mr. McNamara was graduated as a chemical engineer from the Univ. of South Carolina and received his M.S. degree in paper chemistry from the Institute of Paper Chemistry.

He was previously employed as chief chemist for West Virginia Pulp & Paper Co., Luke, Md.

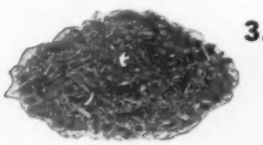


1. WET MATERIAL

. . . containing 70% moisture flows into the hopper.

2. THE DOUBLE SQUEEZE

First, it is squeezed between the top roll and feed roll. Second, between the top roll and discharge roll. The combination of pressure and shredding (at two points) reduces wet material to small, dry particles.

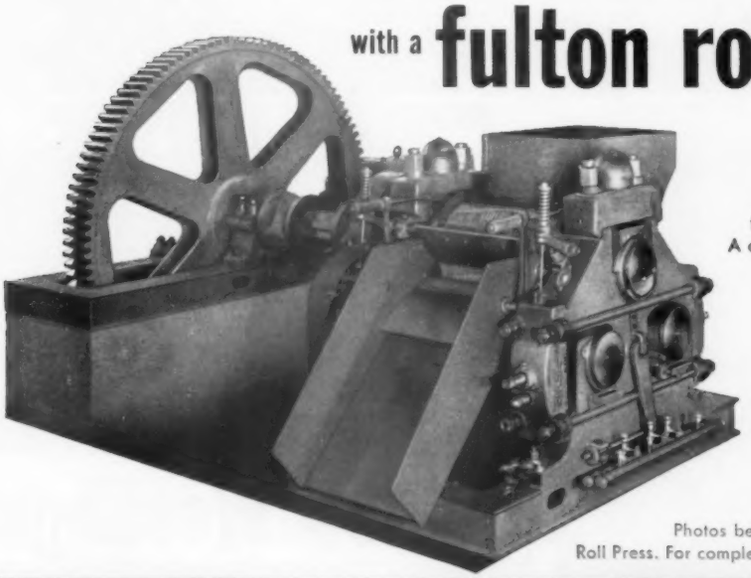


3. DRY MATERIAL

. . . with moisture as low as 47% is the final result.

DEWATER BARK OR OTHER FIBROUS MATERIAL

with a fulton roll press



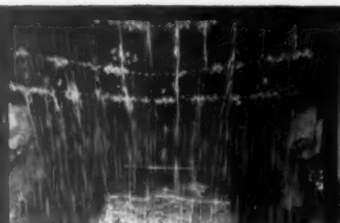
Equally efficient for knots, tailings and most fibrous materials. A continuous, low-cost operation.

Photos below show efficiency of the Fulton Roll Press. For complete information write Fulton direct.

FULTON

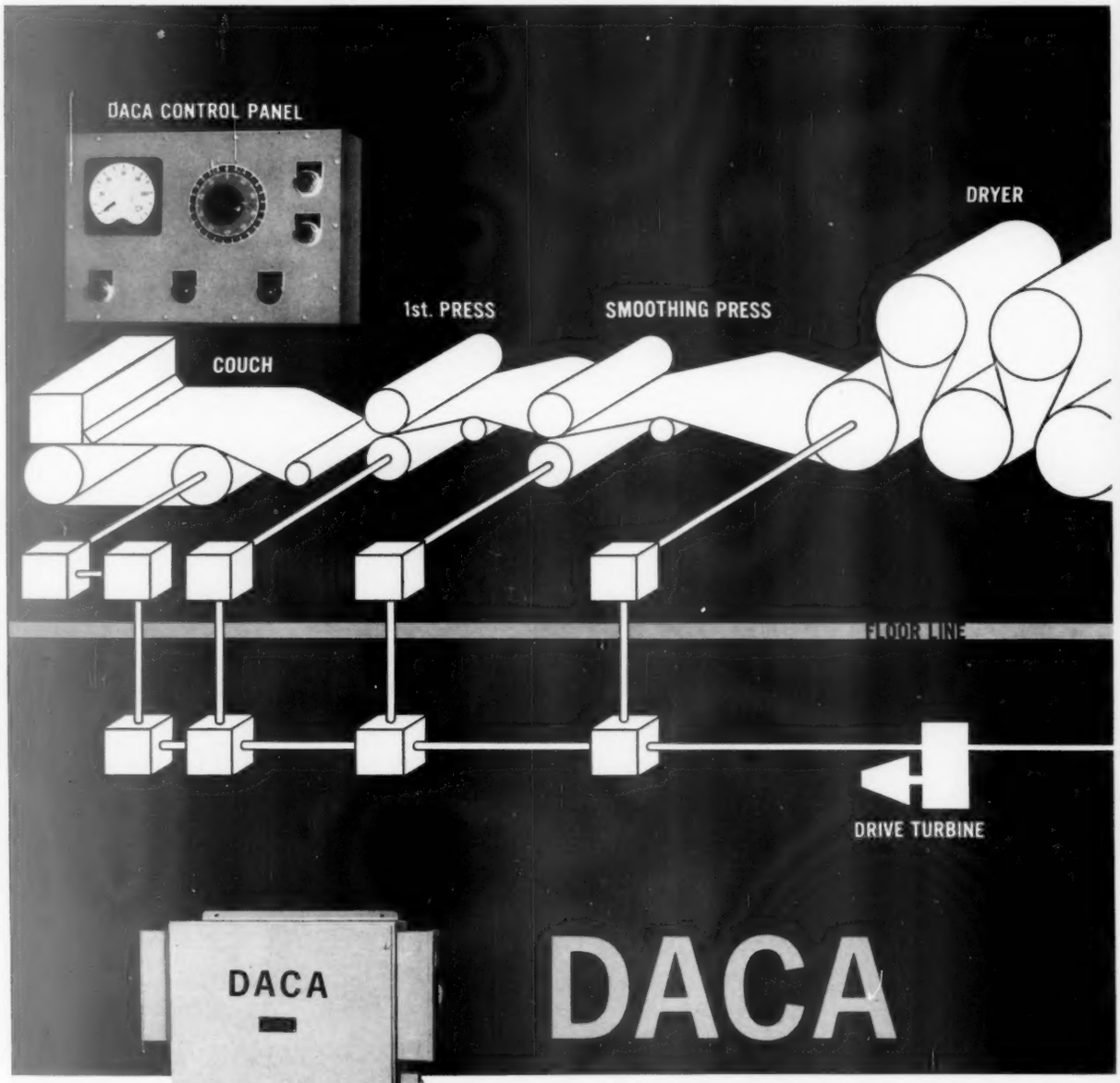
IRON WORKS COMPANY
ST. LOUIS 10, MISSOURI, U. S. A.

FULTON
SINCE 1852



Water is squeezed from bark containing 70% moisture and averaging only 5,582 BTU's per pound.

Dry fuel containing only 47% moisture and averaging 7,390 BTU's . . . ready for economical burning.



EXACT POWER AND PRECISE CONTROL of paper machine drives are yours with new Westinghouse DACA governor control. DACA preset control panel (top) and sensing unit (bottom) hold turbine drive (right) within the most exacting requirements of the paper industry. Control panel is usually installed at the "wet end" of the paper machine. The sensing unit may be located near the turbine, or remote.

New Westinghouse

FOR MOST PRECISE CONTROL OF

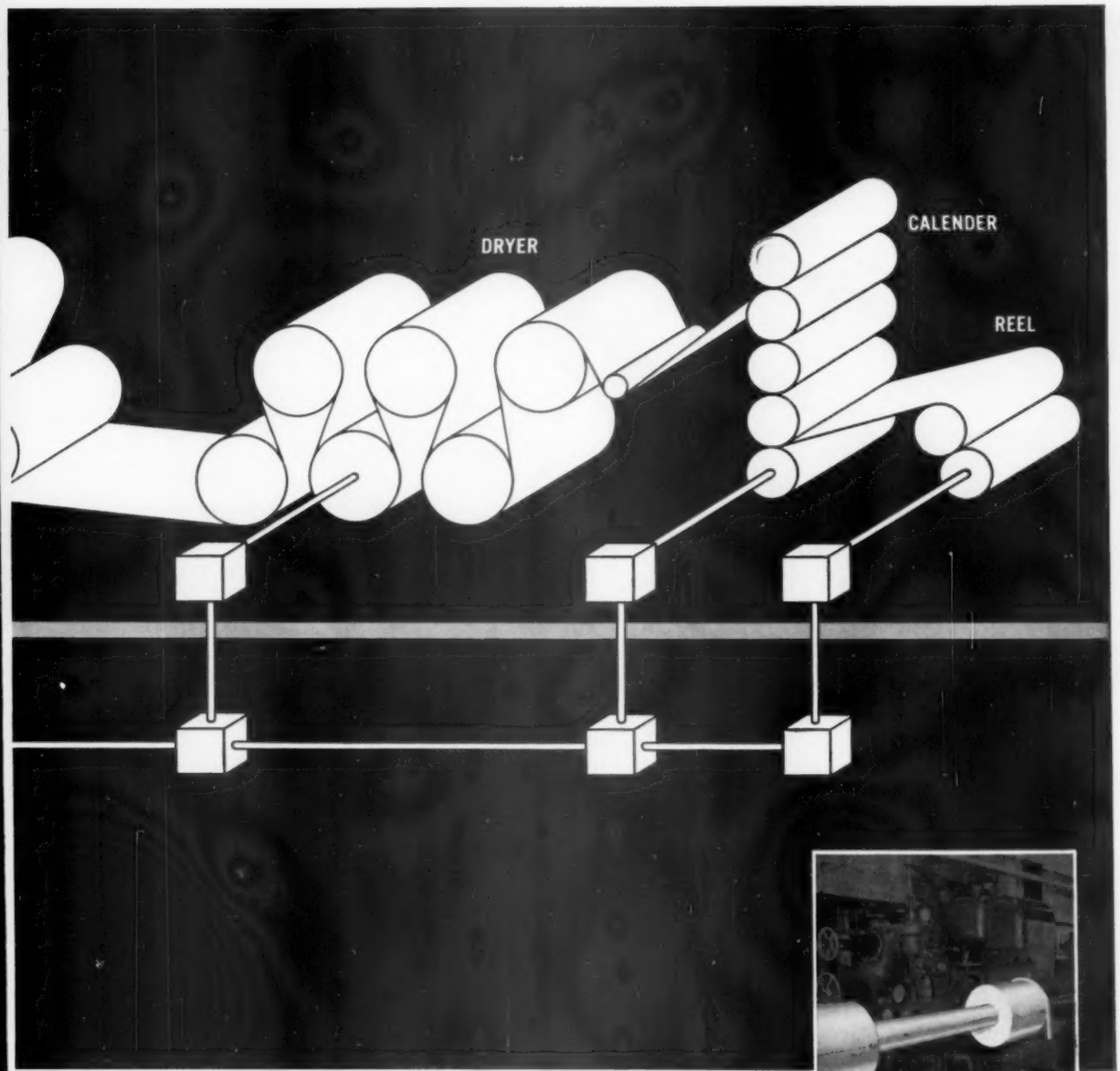
Better paper quality demands exacting control of the machine drive over a wide speed range. Westinghouse's answer: the all-new Digital Analog Control Apparatus, called DACA, an entirely different control concept!

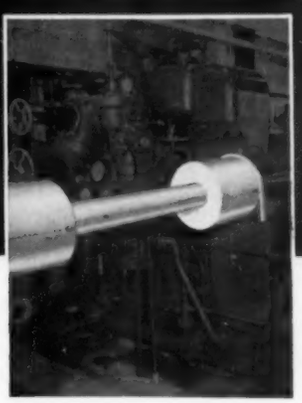
Thoroughly tested for four years, DACA offers you these unique advantages:

Ultra-precise speed control. DACA holds turbine-powered lineshaft drives to plus or minus 1/10 of 1% of any set speed throughout a 10-to-1 speed range.

Automatic speed selection. A preset speed control device gives precise speed selection throughout the entire 10-to-1 range, as well as for "wash" and "cleanup" speeds.

Combines desirable features of digital and analog techniques without the complexity of an expensive computer.





Digital Governor Control

TURBINE-DRIVEN PAPER MACHINES

Static circuitry. No electronic tubes or electrolytic capacitors mean highest reliability as well as long life.

Eliminates down time required by the conventional-type governor to change governor gears for low-speed operation.

Installation flexibility. DACA and preset control can be installed almost anywhere. They work as well when the driving power and paper machine share the same floor as when the lineshaft drive is below the machine, as shown above.

Complete power-backup with oil relay governor and/or batteries.

THE DACA PRINCIPLE: DACA consists of a regular speed governor and servomotor, an electric-hydraulic converter, the DACA speed sensing unit, and the DACA remote preset control panel. Digital impulses from the drive turbine feed back to the DACA sensor and are automatically compared to a reference signal. When signals do not coincide, the error signal causes the speed of the unit to be maintained within the predetermined precise limits.

DACA IS AVAILABLE NOW. For more information on how DACA can help you improve paper quality, contact your nearest Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

J-50615

YOU CAN BE SURE...IF IT'S **Westinghouse**

NOW...prompt delivery from mill stocks!

STAINLESS HEAT EXCHANGER TUBES

Save time in getting Types 304 and 316 stainless condenser and heat exchanger tubes for new units or re-tubing jobs. Call your nearest Carpenter office for prompt delivery from large mill stocks of sizes ⅜" to 1" O.D. in 18 and 16 BWG. Stock lengths up to 40 feet are cut to your specific requirements. These full-finished tubes fully meet ASTM Spec. A-249. Besides, they pass the most searching nondestructive test applied to stainless tubing anywhere. This extra-close quality control is your assurance of getting the highest possible degree of perfection and dependability in Carpenter Stainless Tubes. That means savings in time, money and trouble for builders and users of heat transfer equipment.

If you need other standard or special-purpose types of heat exchanger tubes, Carpenter can supply them also. Our technical staff is always available for competent assistance on any stainless tubing or pipe problem. For prompt service on your next orders, contact your Carpenter representative or the mill.

The Carpenter Steel Company, Alloy Tube Division, Springfield Road, Union, N. J.

your master key to cost-saving corrosion control

Carpenter

Stainless Tubing & Pipe

Pacific

John V. Roslund, 60, widely known throughout the U.S. industry, died of cancer March 1 at Portland, Ore. following 3-month illness. Associated with Asten-Hill Mfg. Co. for about 25 yrs., he worked for this organization on the Atlantic Coast until moving to Portland in 1949 to become manufacturers agent on Pacific Coast for Asten-Hill, H. Waterbury & Sons Co., Downingtown Mfg. Co., and Frank W. Egan & Co.

Jerry S. R. Roslund, formerly asst. to vice president of a Calif. hotel group, is West Coast sls. rep. for H. Waterbury & Sons Co., working out of his home at 3210 Marigold St., Portland, Ore. His father, the late **John V. Roslund,** represented the firm on the Pacific Coast for the past 10 years.

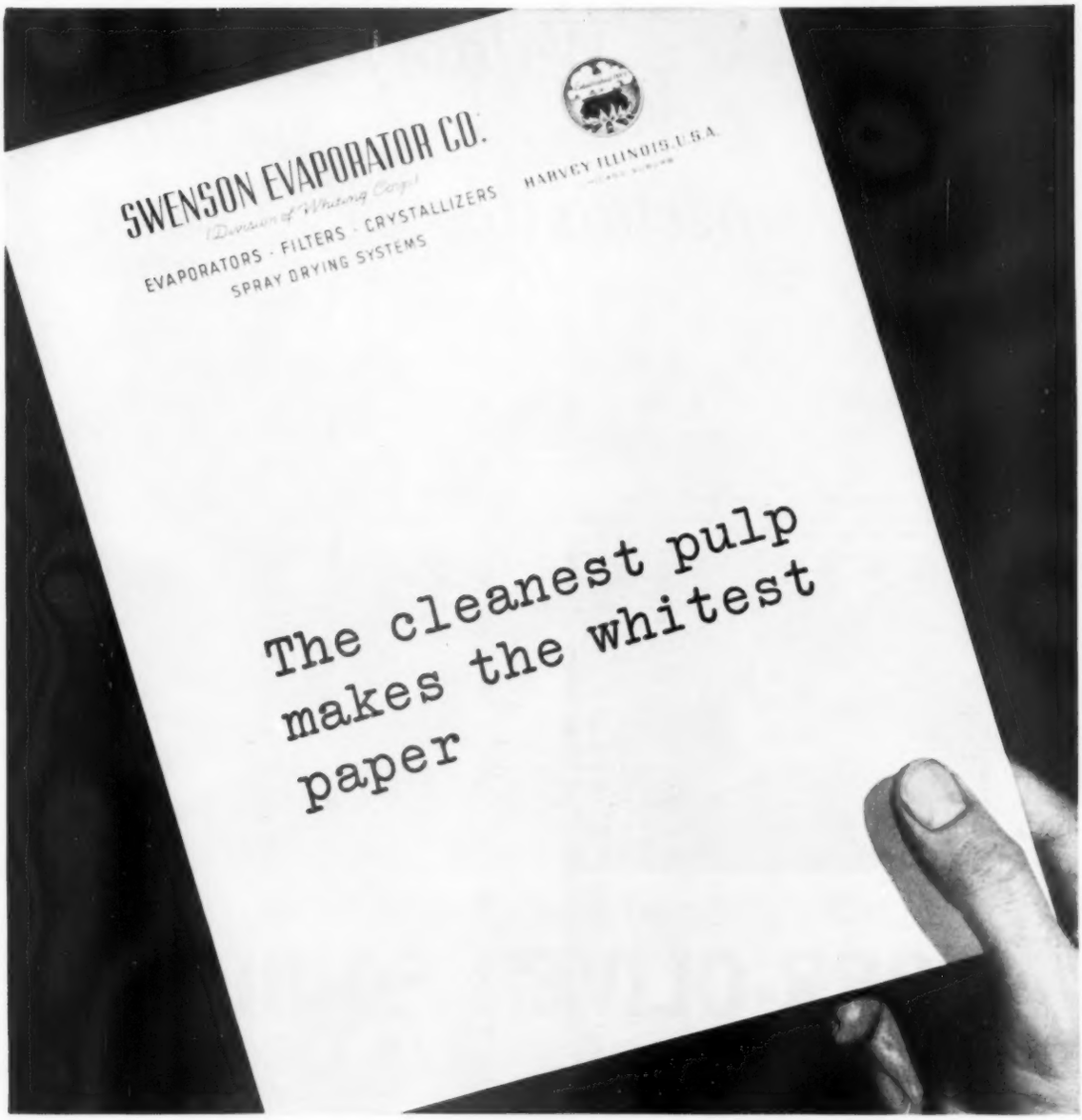
R. J. Seidl, Research Dir. for Simpson Timber Co.

He will head special forest biology symposium, sponsored by TAPPI Forest Biology Committee, Aug. 24-26 at New Washington Hotel, Seattle, Wash.

Boylon Erickson

F. O. Boylon Named Vice Pres. of CZ

Mr. Boylon joined Crown Zellerbach Corp. at Camas, Wash., in 1958 following 14 years in the industry. He becomes res. mgr. of that mill after having served as asst. res. mgr. at both Ocean Falls, B. C., and Camas. Mr. Boylon succeeds **E. W. Erickson** as vice pres. for manufacturing. Mr. Erickson retired April 1 after 40 years with Crown Zellerbach. His successor transferred to the San Francisco headquarters as asst. vice pres. for manufacturing last June.



Clean pulp is a basic requirement for economical bleached pulp and white paper production. Swenson pulp washers provide this clean pulp—and produce it with an extremely low dilution of the recovered black liquor. As a result, both bleaching costs and chemical recovery costs are held to a minimum. These operating advantages are backed by proven mechanical reliability and such features as self-aligning roller bearings and high strength deck construction. Specify Swenson pulp washing equipment.

FREE BOOKLET . . . Provides new insight into pulp-washing efficiency. Write today for Bulletin SW 300! *Swenson Evaporator Company, 15632 Lathrop Avenue, Harvey, Illinois.*

PROVED ENGINEERING FOR THE PROCESS INDUSTRIES SINCE 1889

SWENSON

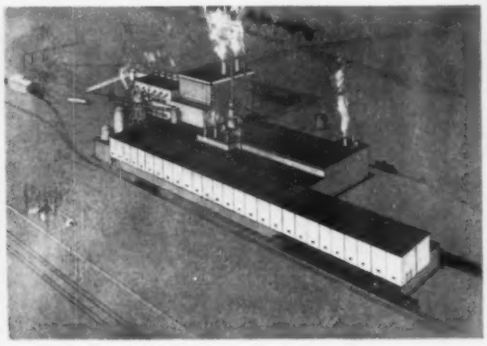
A Division of WHITING Corporation

WHITING—MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY AND RAILROAD EQUIPMENT

Waldorf-Hoerner unfolds spectacular expansion

FIRST STEP in the creation of Montana's first completely integrated pulp and board facility is shown in this photo of Waldorf-Hoerner's chemical pulp plant, completed in 1958.

ADDITION OF PAPER MILL, as it will appear when finished, is shown in drawing above. Building is 700 feet long and 70 feet wide.



...with advanced production techniques featuring

DORR-OLIVER EQUIPMENT

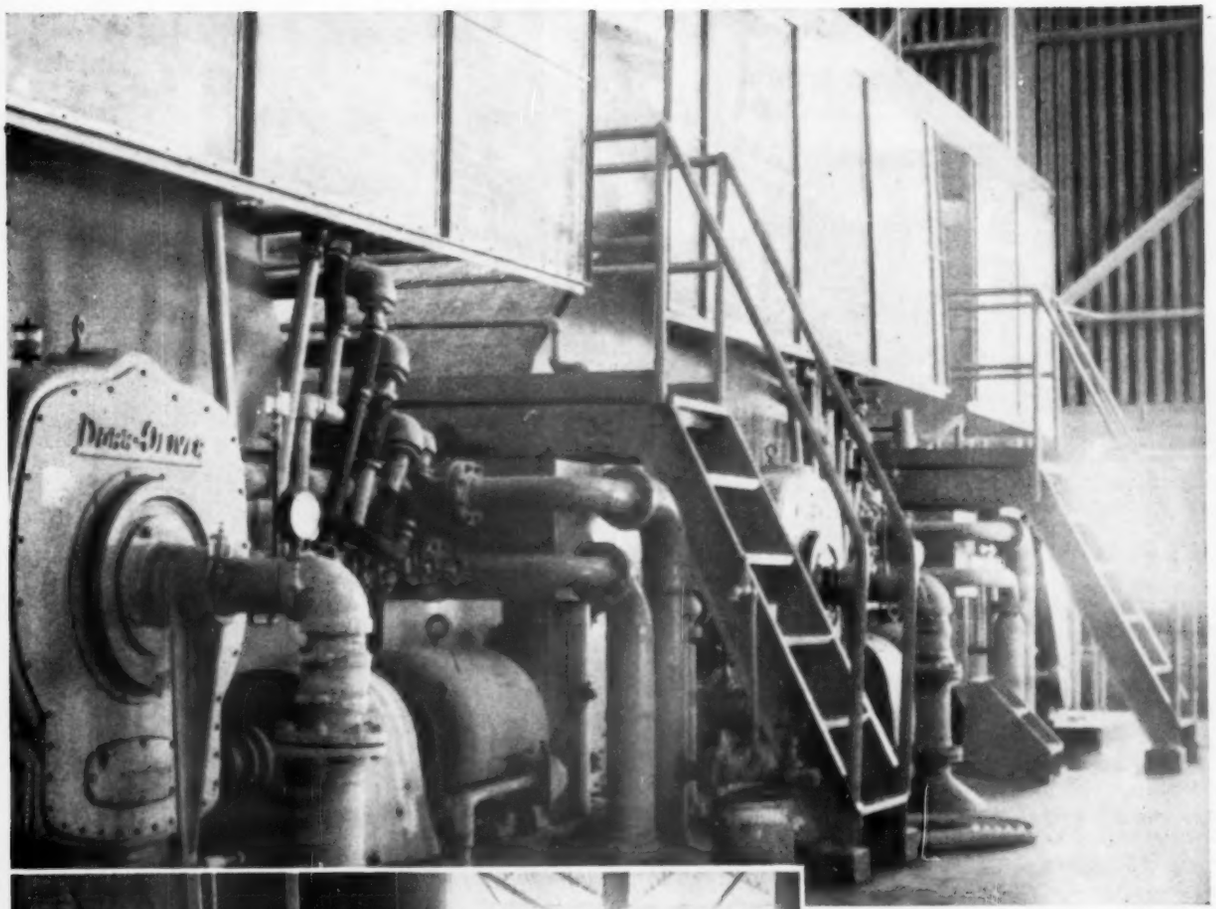
Rapid expansion, development of many innovations in production and the use of proven Dorr-Oliver systems and equipment are features of the spectacular operation of the Waldorf-Hoerner Paper Products Co., at Missoula, Montana.

The chemical pulp mill, producing unbleached kraft pulp, now includes an Oliver Brownstock Washing System with three 11½ ft. dia. x 20 ft. face single drum washers.

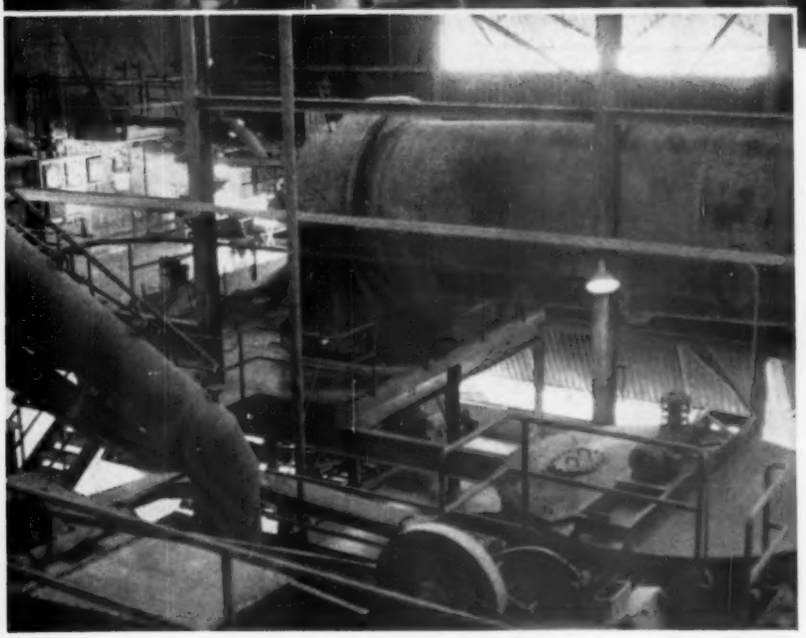
The Dorr Recausticizing System, of unconventional and simplified design, has both primary and secondary slaking, a single compartment Green Liquor Clarifier, unit-type White Liquor Clarifier, two-stage Lime Mud Washer and Dorr-Oliver Hot Lime Crusher. A new Lime Mud Washer is being added which, with minor rearrangement of existing equipment, will provide up to 700 TPD of liquor making capacity.

The Waldorf-Hoerner expansion program will utilize a complete Dorr-Oliver bleach plant and water treatment facilities to provide an integrated pulp and board operation.

For more information on the full range of Dorr-Oliver equipment and services for the pulp and paper industry, write to Dorr-Oliver Incorporated, Stamford, Connecticut.



OLIVER BROWNSTOCK WASHING SYSTEM comprises three 11½ ft. dia. x 20 ft. face drum washers, each operating single stage but capable of two-stage operation.



PART OF THE DORR RECAUSTICIZING SYSTEM is seen in this photo, looking across the slaker to the lime kiln. System is highly instrumented and incorporates advances in design which simplify operation and improve recovery.

DORR-OLIVER
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

SAVE! SAVE!

From $25 to $450 a year on Oil Alone . . . with a

RIDGILR!

How much oil do you use each day threading pipe, rod or conduit by hand or power drive?

One-half pint? One gallon? If it winds up on the floor, you're spending somewhere between $25 and $450 a year just for the privilege of cleaning up oil.

The RIDGILR saves that money for you . . . lets you use all the oil you should!

- **Ends Oil Waste and Messy Floors**—Costly oil is double screened and re-used again and again.
- **Lengthens Die Life**—Well oiled dies last longer, stay sharper . . . gives cleaner threads for fast, easy installation.

The easy-to-carry RIDGILR comes complete with a screened chip pan, circulating oil reservoir and hose-connected hand pump-gun. See it . . . buy it at your local Supply House. You'll be glad you did!

Costs Only $23.20 with 2 gallons of RIDGID Thread Cutting Oil!

RIDGID Dark and Nu-Clear Thread Cutting Oils are available in convenient (4 ounce Nu-Clear only), 1 quart, 1 gallon, (2 gallon Nu-Clear only), 5 gallon, 30 gallon and 55 gallon containers.

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.

John H. Quigley Feted For Long Service

Paper machines supt. (kraft) for Crown Zellerbach Corp. at Antioch (Cal.) div., Mr. Quigley was presented 40-year pin at the CZ's annual awards dinner. Here he presents corsage to a guest—his wife Rose.

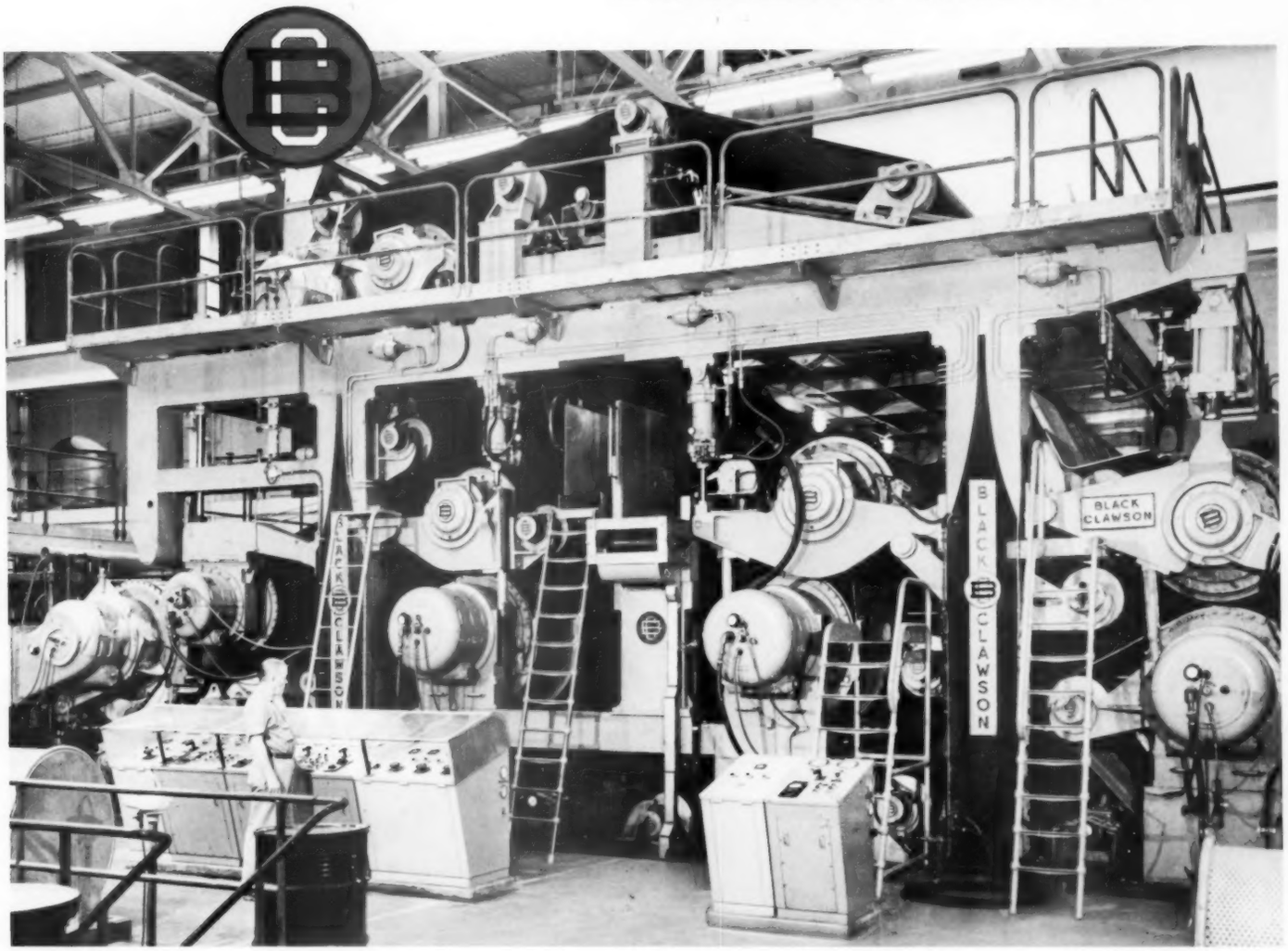
David R. Riggs, formerly vice pres. and eastern div. gen. mgr., Container Corp., becomes sales vice pres., eastern region of Weyerhaeuser Co.'s Shipping Container div. . . . **Homer Brock,** staff asst., purchasing, Crown Zellerbach Corp., Portland, Ore., is now engineer, St. Helens, Ore. . . . **Jim Simpson,** Midwest purchasing agent, Western Waxide, St. Louis, is promoted to divisional purchasing agent, San Leandro headquarters.

March Haug

Promotions at Scott Paper's West Coast Mills

Robert E. March, since 1957 mgr. of Scott Paper Co.'s Coos Bay Pulp Corp. plant at Empire, Ore., becomes paper mill mgr. at the large Scott plant at Everett, Wash. He succeeds **A. J. Haug,** who is promoted to mgr. of production services in the corporate staff at Chester, Pa. headquarters. **J. Howard Schneider,** West Coast div. procurement mgr. for four years, transfers to Empire as plant mgr. for Coos Bay Pulp. **Walter C. Miller,** plant mgr. for Coos Bay at Anacortes, Wash., moves to Oconto Falls, Wis., as mgr. of Falls Paper & Power Co. **Jesse Lewis,** production mgr. at Anacortes, is promoted to gen. sup., serving in this capacity as operating head of the plant.

Have You Ever Seen *a cleaner,*
more business-like press section?



It's cleaner in design, uncluttered, easier to operate and maintain because it's been simplified. There's a minimum of parts. Roll removal is an easy procedure . . . so is felting, because all components are accessible.

When engineering paper machine sections, Black-Clawson strives for greater efficiency through design simplification.

The customer is always the beneficiary of advanced paper machine engineering that is based on practical understanding of the papermaker's needs.

The Black-Clawson Company
Paper Machine Division, Watertown, N. Y.

Another Advanced
Engineering Design

BLACK-CLAWSON

Get out the dirt... *she doesn't see!*

D-I LESTOIL LIQUID DETERGENT

No matter what grade of raw stock you use... no matter what care you take in sorting... there's always the danger that grease, oil, wax and other contaminants will get by — to create specs or shiners or otherwise blemish your finished sheet.

Today... increasing numbers of smart mill operators insure against these costly headaches by adding D-I LESTOIL when cooking rags.

D-I LESTOIL speeds up wet-out, assures uniform packing and cooking in the boiler; thoroughly penetrates every fiber. It emulsifies and disperses grease, graphite, wax... all dirt. Produces fibers free of soil, fibers that bleach readily and absorb dye uniformly.

D-I LESTOIL guards against redeposition of soil ... permits complete, free rinsing.

End result? Clean, bright sheets of uniform color and quality.

FREE!

A generous sample and complete details on how to get better quality paper with d-i LESTOIL!

MAIL THIS COUPON TODAY!

LESTOIL, INC.
A subsidiary of Adell Chemical Co.

LESTOIL, INC.
125 Garfield Street
HOLYOKE, MASS.

Please send me a free sample of d-i LESTOIL and complete directions for use.

NAME _____ **TITLE** _____

FIRM _____

ADDRESS _____

CITY _____ **STATE** _____

APPLE PIE ORDER—Alpha® Protein makes still life come alive

It takes more than deserving artwork and fine craftsmanship by an engraver to reproduce delicate colors and subtle-toned shading needed for realism. The paper itself, of course, is the final factor.

This picture is a sample of what you can get with Alpha Protein coated paper. Brilliantly white, truly opaque . . . ideal foundation for colors. Remarkable levelness to assure more uniform ink coverage. A cushioned surface to give sharp definition with less printing pressure.

Alpha Protein, a chemically isolated soy protein binder made by the Chemurgy Division, is rigidly controlled at all stages of manufacture for absolute uniformity. Availability and price fluctuations are never a problem. Its economy is quickly reflected in improved production speeds, faster drying, higher coat weights.

Chemurgy technical representatives are anxious to serve you.

25

CENTRAL SOYA COMPANY, INC.
CHEMURGY DIVISION

1825 N. Laramie Avenue · Chicago 39, Illinois

This is a sample of 4-color process lithography on Alpha Protein-processed paper

FREE Record Forms help you check

...check DISSTON Chipper Knife performance against any other kind

We'll provide the record materials *free* to help you compare the grinding record, cutting ability and service life, of Disston Chipper Knives, against any knife made. Hardwoods, softwoods, catfaces, and frozen logs . . . run 'em all . . . then let the record speak for itself.

We and our customers already know the answer. Disston Knives are hardened in an exclusive salt bath process that eliminates internal stresses and eliminates cracking. The result is a constant hardness and uniform grain structure. When you sharpen, you get a perfect new edge with the least amount of grinding.

For further proof, we make you this guarantee:
We'll replace any Disston Knife that cracks due to a manufacturing defect!

Prove these facts yourself, now. Send for the free record forms. Write: *Disston Division, H. K. Porter Company, Inc., Philadelphia 35, Pa.*

DISSTON PORTER DIVISION

H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

Sam Runyan, personnel and safety supervisor, St. Francisville Paper Co., St. Francisville, La., has been transferred to Crown Zellerbach Corp., West Linn, Ore., as asst. personnel and safety supervisor.
—Louis H. Blackerby.

Canada

Wang Read Dodge

Three Top Executives Named for Industrial Cellulose

Sigmund Wang, F.C.I.C., president of Industrial Cellulose Research Ltd. since its incorporation in 1948, has been appointed chairman of the board. **D. E. Read,** exec. vice pres. since 1955, has become president. Mr. Read was formerly mgr. of board mills at Gatineau, Que., for Canadian International Paper Co., ICR's parent company.

W. G. Dodge has been appointed vice pres. of ICR. He was previously asst. exec. vice pres. and before that had been on the Montreal staff of International Paper Sales Co.

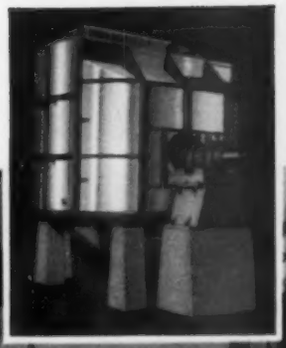
K. R. (Rudy) Meyer Returns to Stadler, Hurter & Co.

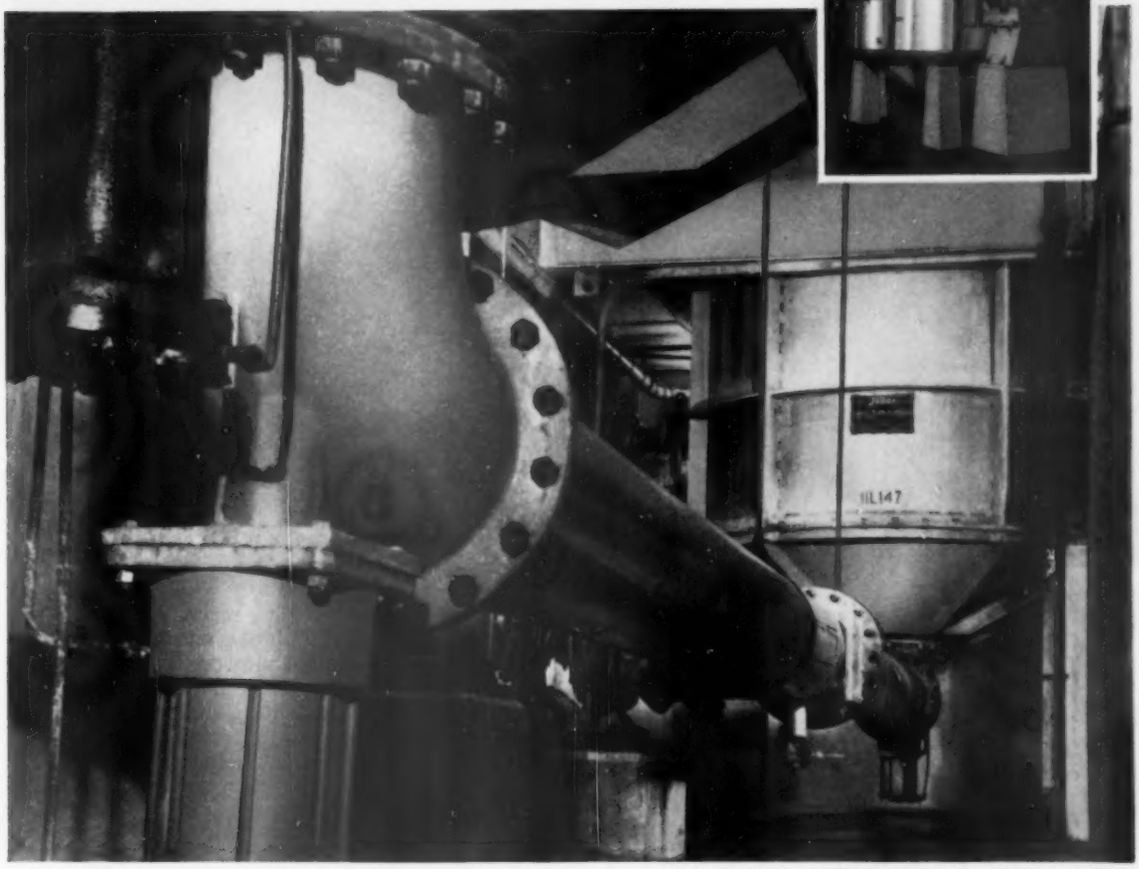
He becomes project mgr., according to announcement by **A. T. Hurter,** president of Stadler Hurter International Ltd., Montreal, Canada.

Mr. Meyer was formerly asst. chief engineer for E. B. Eddy Co., Hull, Que. Prior to joining the Quebec company in 1949, he had been associated with Stadler, Hurter for a three-year period. He is a 1937 graduate of the Univ. of London (Eng.) with a B. Sc. degree in mechanical engineering. Mr. Meyer at one time served as chairman of the Engineering Data Sheet Committee of CPPA's Technical section.

Jones Hi-Lo Pulper at Hurlbut Paper gives

TOP PERFORMANCE ON TOUGH WET STRENGTH





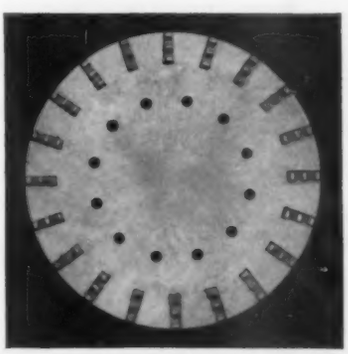
Hi-Lo installation at Hurlbut Paper Co., South Lee, Mass.

Defibers completely with minimum power

At Hurlbut, as in dozens of other mills across the country, the two-rotor Jones Hi-Lo Pulper has proven its ability to provide fast, progressive disintegration at low H.P. days per ton. It is especially effective on wet strength and other hard-to-defiber materials.

The Lo-Speed rotor breaks up the broke or bales economically and circulates the stock across the tank where repeated impacts by the Hi-Speed rotor complete defiberization. Blade construction prevents fiber cutting and freeness drop is eliminated.

For maximum performance with minimum power and maintenance, get full information on the Jones Hi-Lo Pulper. Write for bulletin EDJ-1063B.



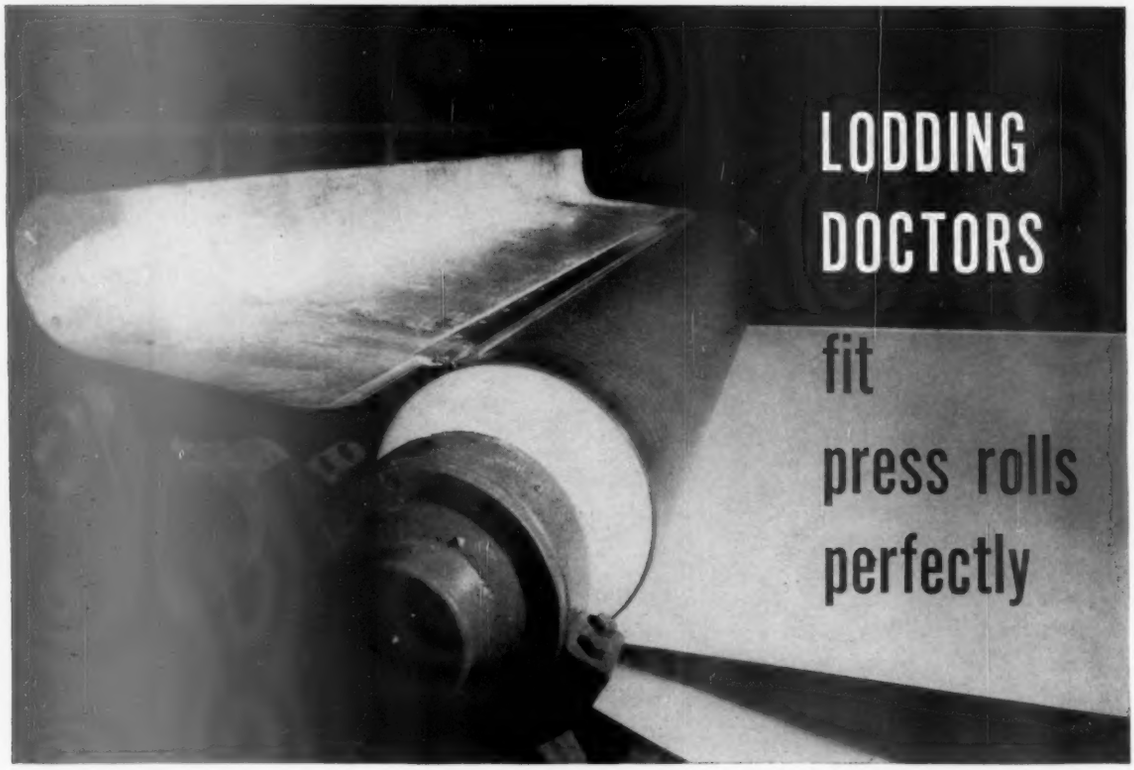
Notched blades of Hi-Speed rotor project only ¼", use power most efficiently for defibering. Held securely by Duroid wedges, they can be replaced easily and inexpensively.

E. D. JONES CORP. member BELOIT group PITTSFIELD, MASS.

Jones

PULP MILL EQUIPMENT AND STOCK PREPARATION MACHINERY

Canadian Associates:
The Alexander Fleck Ltd.
75 Spencer Street, Ottawa



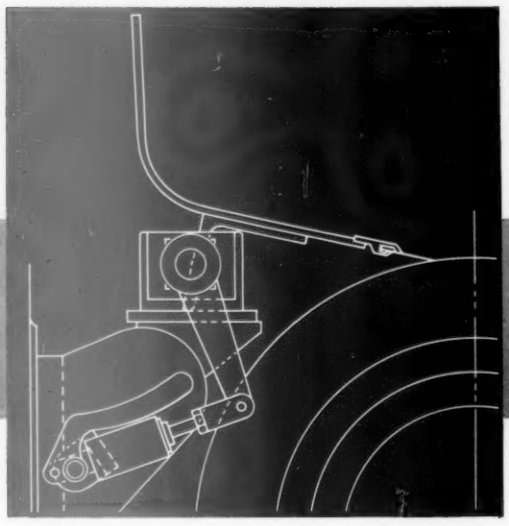
LODDING PRESS DOCTORS are recognized by their ability to remove all water from the roll. Even when running a pond, there is no leakage.

Outstanding performance like this is due to Lodding's specialization in precision doctoring. Every doctor is individually designed for each installation.

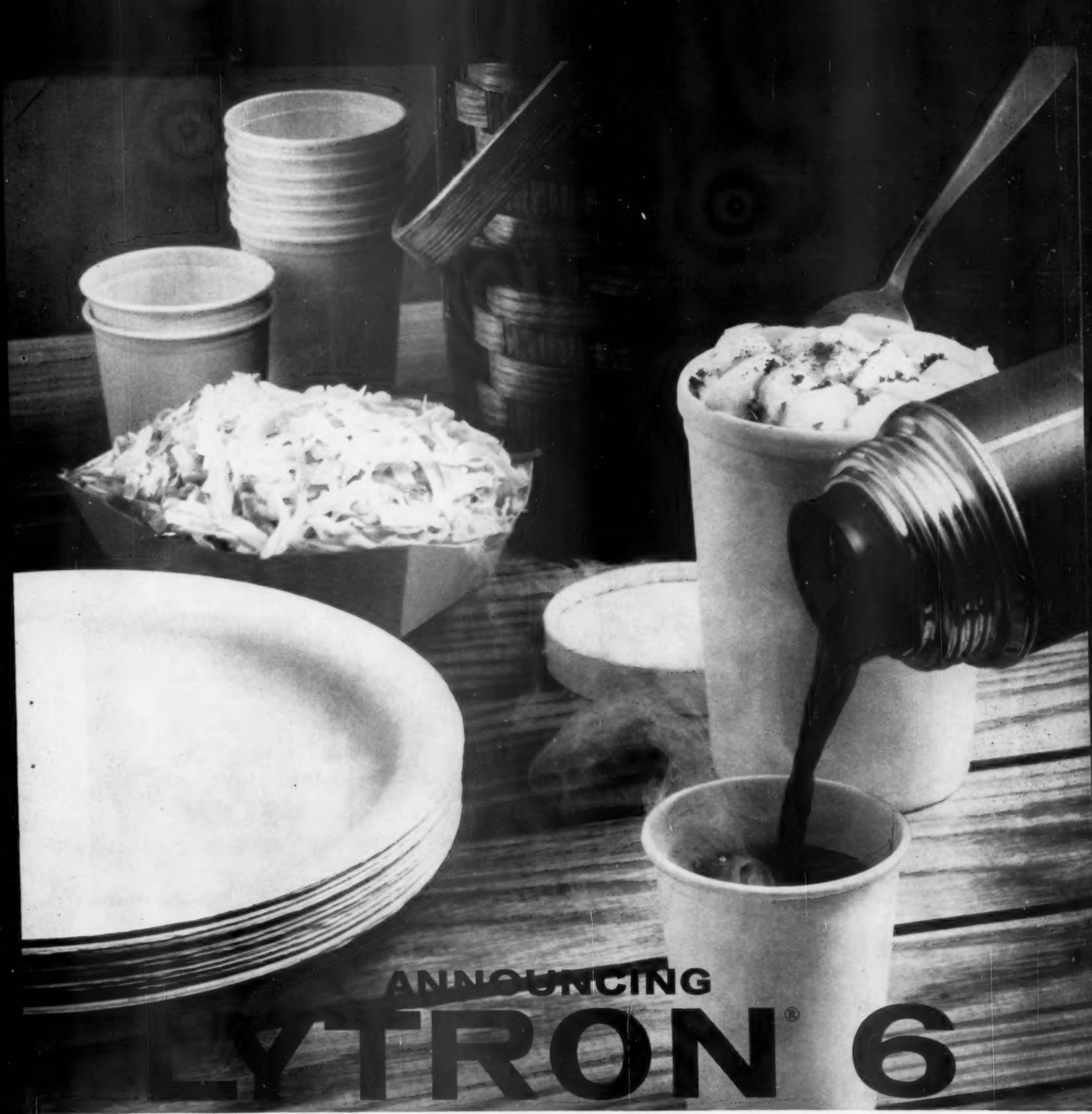
Top press roll doctors are no exception. They are engineered to fit accurately and to provide uniform pressure along the entire length of the doctor blade, regardless of the amount or location of broke on the scoop. The scoop itself is fused into the rugged machined surface of the doctor back for added strength. In addition, perfect alignment with the roll axis is assured by mounting the doctor on the press arms, enabling it to ride with the roll, no matter what position the roll takes.

Details like these guarantee the unique dependability of Lodding custom-made doctors in thousands of world-wide applications. Whatever your need for doctors, from Fourdrinier to reel, you can rely on Lodding, the recognized world leader in precision doctoring.

Write, wire or phone Lodding or your nearest sales representative for complete technical information.



LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS



A new water-white latex – exempt from Food Additive Amendment for flexible film coatings on throw-away paper cups, plates, other single service containers

- styrene copolymer – unplasticized for greater processing efficiency
- clear, glossy, non-yellowing coating – stays white during processing and after long storage periods
- grease-resistant; resistant to cold or hot boiling water
- products won't stick, even at high dispensing machine temperatures
- odorless and tasteless – no "paper odor" even after contact with hot water; no "paper taste" imparted to contents

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MONSANTO DEVELOPER IN **PLASTICS**

For samples and complete product and regulation data on Lytron 6, write to Monsanto Chemical Company, Plastics Division, Room 731, Springfield 2, Massachusetts.

YOU CAN'T FIND A
MORE DEPENDABLE DEAL
THAN
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COALS FOR
EVERY
PURPOSE!

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NEWS OF SUPPLIERS TO THE INDUSTRY

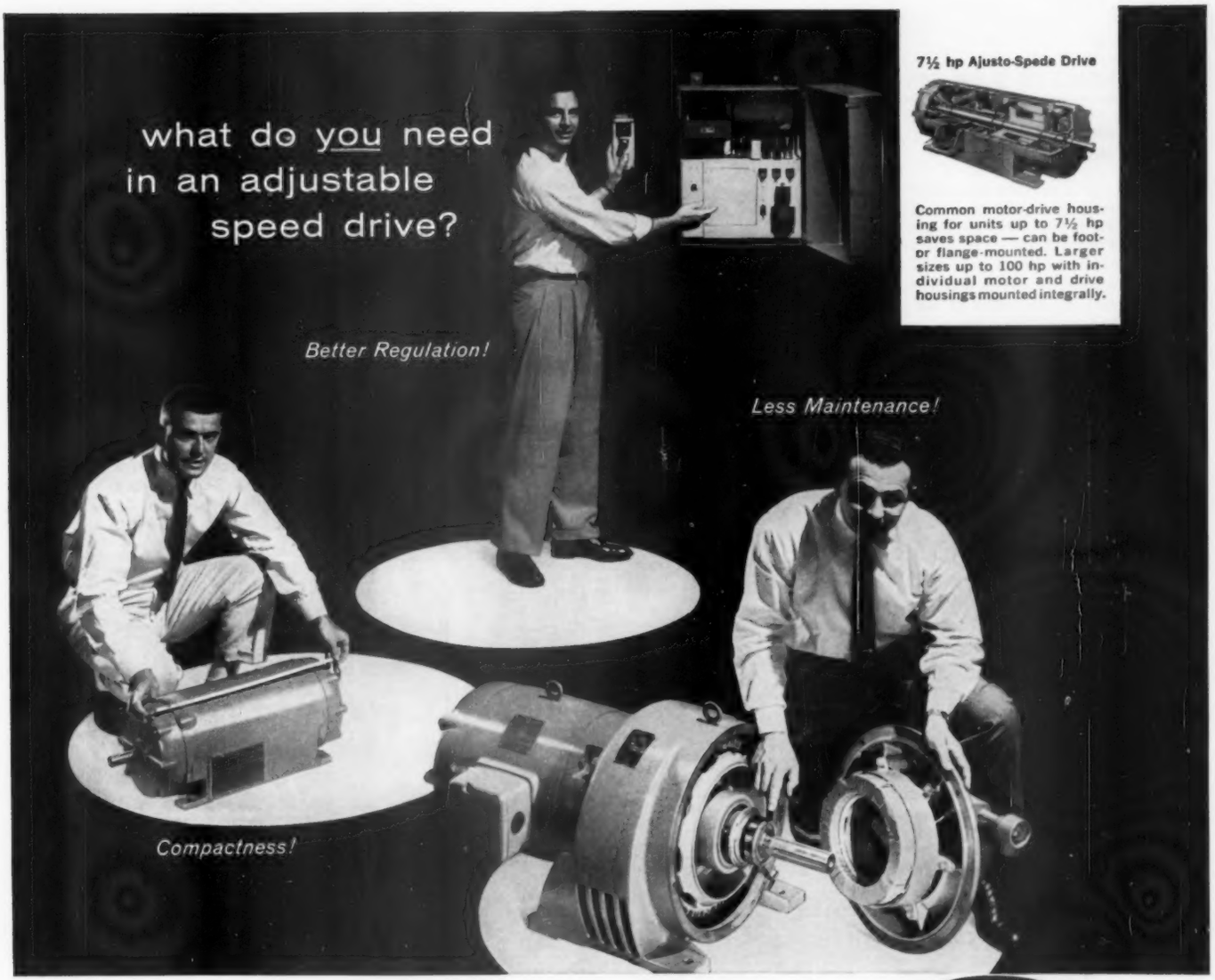
Leonard J. Wood, Paper Div. Mgr., National Starch

Formerly paper development and service mgr., he now directs National Starch & Chemical Corp.'s broad-scale development program for paper and board. A native Texan, Mr. Wood joined the company in 1946 as a chemist in the Paper Service & Development dept., was transferred to the New England sales office in charge of adhesive and starch technical sales in 1953 and was made supervisor of paper technical service in 1955.

Meet Huyck's
WELCH

Bill Welch, a Chemical Engineer from Yale University, is a Sr. Research Engineer in Huyck's Development Dept. In this capacity, his five years of practical paper mill experience serve him well to better understand machine requirements. He and his group work continually to improve needled and woven felt performance and life, and work closely with papermakers to translate the latest Huyck advancements into better felts for all.

HUYCK FELTS
First in Quality . . . First in Service Since 1870



7½ hp Ajusto-Spede Drive

Common motor-drive housing for units up to 7½ hp saves space — can be foot- or flange-mounted. Larger sizes up to 100 hp with individual motor and drive housings mounted integrally.

The Louis Allis AJUSTO-SPEDE® drive is more compact, precise, and trouble-free

Here's an adjustable speed drive that allows *truly precise* machine operation. Speed regulation is automatic and stepless — results in faster, more efficient production at lower cost, with less waste, and minimum wear on equipment.

These and other benefits are yours when you use the improved Louis Allis Ajusto-Spede drive. For example, it can be set before or during operation to deliver any desired speed within its range. Its *exclusive* tachometer feedback circuit monitors the output speed and *automatically corrects speed and holds it* regardless of load changes.

This improved drive requires minimum maintenance. Its stationary field has no brushes, commutators, or slip rings to cause trouble. The source of power is an equally trouble-free standard a-c squirrel cage motor.

®Ajusto-Spede is a registered trademark of the Eaton Mfg. Co.

The cast-iron housing keeps out dirt, chips, and moisture — resists corrosion.

The compact Ajusto-Spede also saves space. Integrally-mounted motor and drive simplify handling — can be easily adapted for installation on new or existing machines. Controls can be mounted at the machine or any other convenient position.

The Louis Allis Ajusto-Spede drive is the practical solution to almost every application that requires dependable, easily controlled adjustable speed. It is the answer to precise operating speeds for machine tools, process machinery, test equipment, windups, conveyors, printing presses, and other equipment. Contact your Louis Allis District Office for information and application help. Or write for bulletins 2750 and 2800 — The Louis Allis Co., 444 E. Stewart St. Milwaukee 1, Wis.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

AS-105

Philadelphia Salutes Moore & White

. . . on 75th anniversary of manufacturer of papermaking machinery. **Joseph P. McTommoney** (1) accepts tribute from **Peter Schauffler**, Philadelphia deputy director of commerce. Said Mr. McTommoney, "Through research, development and the fine effort of our employes, the names of John Moore and J. Atwood White must continue in high regard throughout the American paper industry".

TILT
THE VAT BOX FOR RAPID PLATE CHANGE OR WASHING OUT!

- All parts in contact with paper stock are stainless steel.
- For use in either Fourdrinier or cylinder machines . . . built for 8, 10, 12, and 14 plates.

MURCO STAINLESS STEEL FLAT SCREEN

MURCO Stainless Steel Flat Screen is particularly adaptable for running different colors and grades of paper and board stock — any operation where cleaning and preparing the screen for the next run demands continuous operation without loss of time . . . plate section can be removed entirely and replaced easily instead of taking up the plates. Built for 8, 10, 12, and 14 plates, all parts in contact with the paper stock are stainless steel . . . its exclusive feature is the non-tip diaphragm actuating mechanism . . . diaphragms are designed to be easily removed without disturbing the other parts. It has eccentric drive mechanism — one drive unit for each four screen plates — eccentric and end bearings equipped with anti-friction self-aligning bearings. Its features of construction and quiet, free vibration operation with high production but low horse power requirements are surprising to mill men wherever the MURCO Stainless Steel Flat Screen is installed.

Complete information with specifications contained in fully illustrated catalog folder . . . yours upon request . . . write for it today.

D. J. MURRAY MANUFACTURING CO.
MANUFACTURERS SINCE 1883 • WAUSAU, WISCONSIN

Sidney G. Briscoe to Represent Inglis in U.S.

He was formerly sales vice pres. of Pusey & Jones Corp., Wilmington, Del. manufacturer of papermaking equipment that recently declared bankruptcy. Certain assets of P&J were acquired by John Inglis Co. Ltd., Toronto. The Canadian firm has been a builder of papermaking machinery for 15 years.

Richard H. Bublitz New Rep for Hubinger Co.

He will cover Wisconsin, northern Illinois and southwestern Michigan for the Bulk div. of Hubinger, Keokuk, Iowa, according to **G. Roy Underwood**, bulk sales mgr. Mr. Bublitz will call on and service paper mills, corrugators and other users of Hubinger products in the area. He was formerly with Kelco Corp.

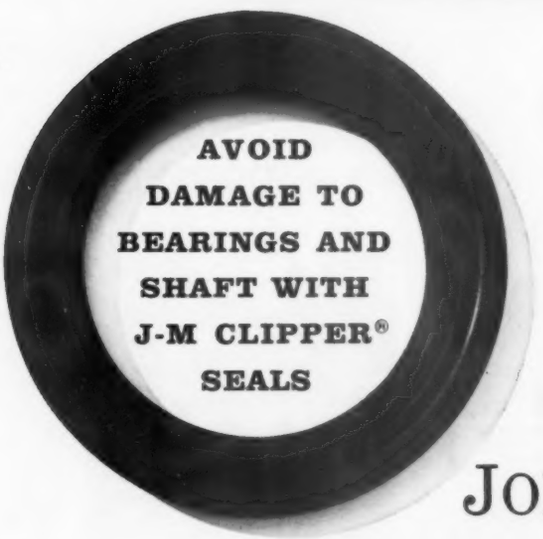
G. D. Carr Joins Sales J. O. Ross Engineering

Mr. Carr teams up with **Ken Jones**, **Paul Goldner** and **Chuck Guischard** of Ross' pulp and paper mill sales staff. He's a 1942 c.e. graduate of U. of Texas, has worked in aircraft design with Curtiss-Wright, and has been with Sturtevant div., Westinghouse since 1946.

The warning that comes too late!

WHEN THIS HAPPENS, it's already too late. Lubricant has leaked out, and dirt or grit have probably damaged your bearings and shaft.

You can avoid sealing problems by using Johns-Manville Clipper Seals because you can count on them to outlast time between regular overhauls. They seal efficiently . . . give better protection. That's why Clipper Seals are selected as original equipment by many automotive, marine and aviation manufacturers.



JOHNS-MANVILLE PRODUCES a wide range of sizes and lip designs—including Split Clipper Seals for quick, temporary replacement – in compounds that will resist every heat, speed or corrosive condition. It is smart maintenance practice to use Clipper Seals, and to keep on hand a small replacement stock of the sizes and designs you need regularly.

Let your J-M Distributor help you select the Clipper Seals that are compounded to meet your exact sealing requirements. Or write to Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario.

JOHNS-MANVILLE
CLIPPER SEALS

JOHNS-MANVILLE JM PRODUCTS

PUSEY & JONES ACQUIRED BY

Inglis

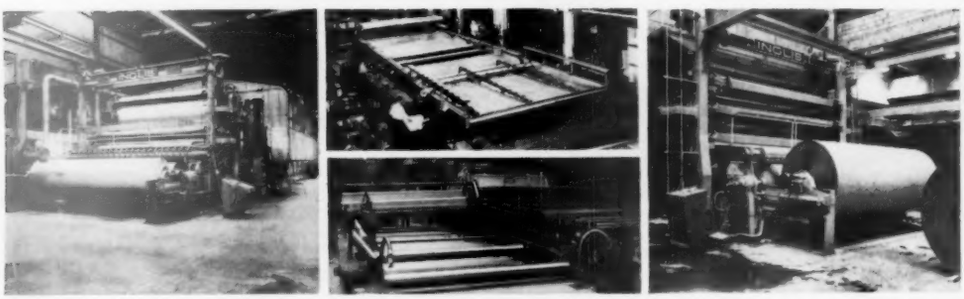
John Inglis Co. Limited, of Toronto, Canada, has purchased the assets of the Pusey & Jones Corporation, paper machinery manufacturers of Wilmington, Delaware. These assets include patents, trade-marks, the right to use trade name "Pusey & Jones", drawings, patterns, tooling, jigs and fixtures, inventories, work-in-process, the widely known Pusey & Jones Plastometer—in fact all assets other than real estate, buildings and machinery.

The John Inglis Company has manufactured pulp and paper machinery for many years, and since 1945 has been associated with the Pusey & Jones Corporation, building paper machines and components in Canada to the Pusey & Jones designs.

With the acquisition of these assets, Inglis is in a position to supply not only new machines, rebuilds, components, etc., but to supply service and spare parts to all customers of Pusey & Jones in all parts of the world.

Enquiries should be directed to John Inglis Co. Limited, 14 Strachan Avenue, Toronto, to the attention of Mr. K. S. LeBaron.

JOHN INGLIS CO. LIMITED 14 Strachan Avenue, **TORONTO, CANADA**



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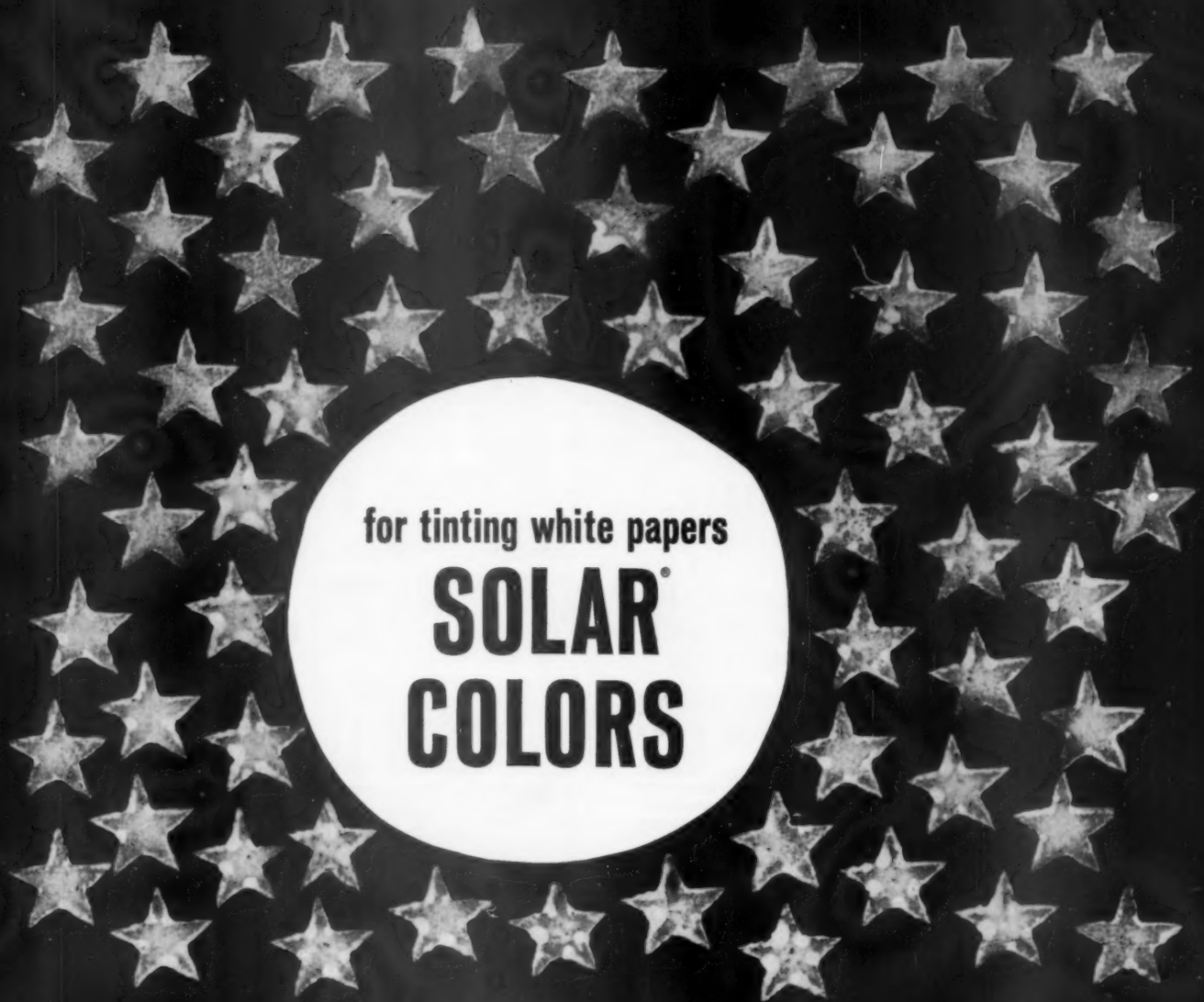

PROVIDE A FULL RANGE OF EYE-APPEALING SHADES

Easy-to-handle because of non-dusting and non-caking properties, these economical water-dispersible pigments also provide the outstanding advantages of: maximum brilliance of shade • excellent light fastness • uniform dispersion • quick wetting-out • process stability

Solar Blue BTN 58-5612	Solar Blue RMN 57-2612	Solar Green BTN 68-3012
Solar Blue BMN 57-5612	Solar Blue RM Liquid 57-2019	Solar Green BMN 67-3012
Solar Blue DM 57-3692	Solar Blue TTN 58-5692	Solar Pink BT 38-5012
Solar Blue GTN 58-6612	Solar Blue TMN 57-5692	Solar Pink BM 37-5012
Solar Blue GMN 57-6612	Solar Blue UTN 58-6692	Solar Violet RTN 48-3612
Solar Blue RTN 58-2612	Solar Blue UMN 57-6692	Solar Violet RMN 47-3612

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Meeting Dates

May 2-3
Instrument Society of America Electrical Safety Instrumentation Symposium
Wilmington, Del.

May 5
Connecticut Valley PIMA
Hotel Northampton, Northampton, Mass.

May 9-12
Instrument Society of America Instrument-Automation Conference and Exhibit
Civic Auditorium and Brooks Hall, San Francisco, Cal.

May 10
Golden Gate District TAPPI (True Memorial Lecture)
Hotel Clarmont, Berkeley, Cal.

May 11-14
Fluid Controls Institute Inc. 1960 Spring Meeting
The Greenbrier, White Sulphur Springs, W. Va.

May 12
Ohio TAPPI (Ladies Night)
Hartwell Country Club, Cincinnati, Ohio

May 13-14
Pennsylvania-New Jersey-Delaware PIMA
Hotel duPont, Wilmington, Del.

May 23-25
TAPPI Coating Conference
Edgewater Beach Hotel, Chicago

May 23-26
American Society of Mechanical Engineers (Design Engineering Conference)
Coliseum, New York, N. Y.

June 7-8
Waste Paper Symposium (Waste Paper Utilization Council)
Conrad Hilton Hotel, Chicago

June 7-9
National PIMA Annual Convention
St. Francis Hotel, San Francisco, Cal.

June 14-16
TAPPI Bleaching Conference
Edgewater Beach Hotel, Chicago

August 24-26
TAPPI Forest Bilogy Symposium
New Washington Hotel, Seattle, Wash.

September 18-21
National Paper Trade Assn. Semi-Annual Fall Meeting
Conrad Hilton, Chicago

October 10-13
10th TAPPI Corrugated Containers Conference
Royal York Hotel, Toronto

REQUIRED IMMEDIATELY

FOR NEW PULP MILL IN BRITISH COLUMBIA

TECHNICAL SUPERINTENDENT
ELECTRICAL SUPERINTENDENT
OPERATING TOUR FOREMEN

Celgar Limited plans to fill these positions now in time to allow successful applicants to assist in checking equipment installations in the new 500-ton bleached kraft pulp mill under construction at Castlegar.

Here is an unusual opportunity to participate in building and operating a modern pulp mill. Celgar is a well-established Company offering attractive salary schedules and welfare plans in one of Canada's finest residential locations.

Experienced pulp mill personnel interested in advancement are invited to submit a confidential detailed letter of application as a basis for personal interview.

WRITE NOW TO:

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1030 W. GEORGIA STREET
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Attn: L. S. McGill

Applications will also be accepted for experienced operating personnel such as PULPING GROUP LEADERS, BLEACHERY OPERATORS, COOKS, RECAUSTICIZING OPERATORS and SIMILAR KEY OPERATING POSITIONS but interviews for these positions will not be conducted before June 1st.

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Fourdrinier Wires • Cylinder Moulds • Cylinder Wires • Watermarking Rolls • Washer Wires • Cylinder Covering Service • Dandy Rolls and Drives • Continuous Size Strainers • Fin Rolls

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HOLYOKE, MASSACHUSETTS

Knox Felts

KNOX WOOLEN COMPANY

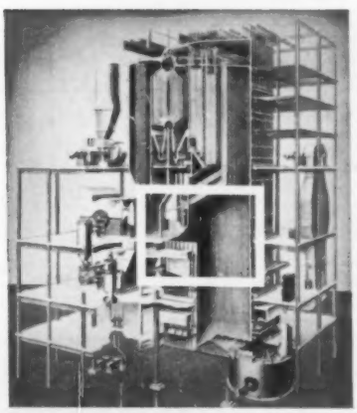
CAMDEN, MAINE

America's First Manufacturer of Endless Paper Machine Felts

How Tangential Air Improves Furnace Performance

In the C-E Recovery Unit, secondary air is introduced tangentially above the liquor sprays by an exclusive C-E method that intimately mixes high velocity air with unburned gases. Combustion is rapid and complete. Since the tangent jets of air give the gas mixture a turbulent, spiralling motion, longer travel within the furnace results. This eliminates stratification and reduces the amount of unburned char entering the screen and superheater zones. Temperature of exit furnace gases is generally lower and more uniform, too – minimizing slag deposits.

C-E will be glad to discuss with you these and other advantages of *tangential* secondary air – which add up to greatly improved furnace performance.



The C-E Recovery Unit. Section of illustration has been enlarged to show the upward-spiralling gas path produced by C-E's exclusive *tangential* introduction of secondary air. Inset (above, left): diagram of tangent principle.

COMBUSTION ENGINEERING

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.
Canada: Combustion Engineering-Superheater Ltd.

C-258

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

CHEMICAL USERS' GUIDE

To General Chemical Products for the Paper Industry

Product	*Available Forms*	*Commercial Strengths*	*Shipping Containers*	*Applications*
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. *(Alum)*	Commercial & Iron Free: Lump, Ground Powdered	17.25% Al_2O_3	Bags Bulk Carloads	Precipitation of rosin size and filler; water clarification; manufacture of satin white; pitch control; mordant for dyes.
Aluminum Sulfate $Al_2(SO_4)_3$ + Water *(Liquid Alum)*	Commercial & Iron Free: Liquid	36.5° Be (8.3% Al_2O_3)	Tank Trucks Tank Cars	Same as commercial dry product but lower strength.
Salt Cake Na_2SO_4 *(Sodium Sulfate)*	White or Grayish Granules	99.5% Na_2SO_4 95% Na_2SO_4	Bags Bulk Carloads	Used in kraft cooking liquors as the source of Na_2S.
Sulfuric Acid H_2SO_4 + Water	Liquid	66° Be (93.2% H_2SO_4)	Carboys Drums Tank Trucks Tank Cars	Wire souring; parchmentizing; acid wash in last stage of multi-stage pulp bleaching; neutralizing tall oil soaps.
Sodium Thiosulfate, Crystal $Na_2S_2O_3 \cdot 5H_2O$ *(Hypo)*	Colorless Crystals	99.75% $Na_2S_2O_3 \cdot 5H_2O$	Bags Fibre Drums	Anti-chlor.
Sodium Thiosulfate, Anhyd. $Na_2S_2O_3$ *(Hypo)*	White Granules	98% $Na_2S_2O_3$	Bags Fibre Drums	Anti-chlor.
Sodium Sulfite, Anhyd. Na_2SO_3 *("Sulfite")*	White Powder	98.5% Na_2SO_3	Bags Fibre Drums	Anti-chlor.
Sodium Silicate $Na_2O \cdot XSiO_2$ + Water	Liquid	38° to 60° Be Various ratios of Na_2O to SiO_2	Drums Tank Trucks Tank Cars	Adhesive for corrugated and solid fibre board; used in coating mixtures to reduce viscosity and in beater sizing to stiffen paper. Aid in bleaching & flocculation.
Chromium Potassium Sulfate $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ *(Potash Chrome Alum)*	Red Violet Crystals	99.5% $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$	Fibre Drums	Used in "save-all" or white water systems.
Aqua Ammonia NH_4OH + Water *(Ammonia)*	Colorless Liquid	26° Be (29.4% NH_3)	Carboys Drums Tank Trucks	Used with chlorine to form chloramines for slime control. Biological sludge systems nutrient.
Sodium Fluoride	White Powder	98% NaF	Bags Fibre Drums	Preservative and stabilizer for starch in coating mixtures.
Tetrasodium Pyrophosphate, Anhyd. $Na_4P_2O_7$ *(Pyro)*	White Powder	52.1% P_2O_5	Bags Fibre Drums	Felt washing; pitch dispersion.
Sodium Tripolyphosphate $Na_5P_3O_{10}$ *(Tripoly)*	White Powder	56% P_2O_5	Bags Fibre Drums	Felt washing; pitch dispersion.
Nitric Acid HNO_3 + Water	Liquid	42° Be (67.2% HNO_3)	Carboys Drums Tank Trucks Tank Cars	Nitrating pulp; cleaning monel metal.
Phosphoric Acid, Com'l. H_3PO_4	Liquid	75% H_3PO_4 (54% P_2O_5)	Tank Cars	Nutrient in biological sludge systems.
Hydrochloric Acid *(Muriatic Acid)*	Liquid	18°, 20°, 22° Be (27.4% to 34.1% HCl)	Carboys Drums Tank Trucks Tank Cars	Cleaning machinery.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

OTHER PRODUCTS: Sodium Metasilicate; Trisodium Phosphate; Copper Sulphate; Disodium Phosphate; Sodium Bisulfite.

FOR THE LABORATORY OR SPECIAL APPLICATIONS: BAKER & ADAMSON® REAGENTS and FINE CHEMICALS

Basic to America's Progress

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

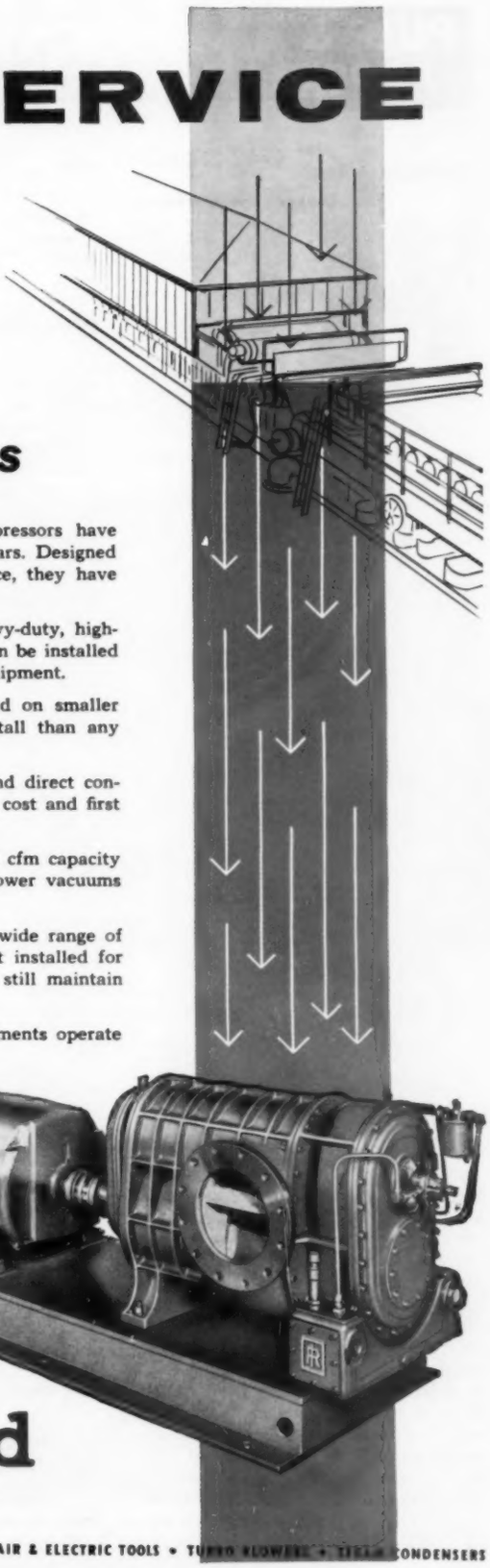
for paper mill

VACUUM SERVICE

only the I-R

Axi-compressor

offers all these cost-saving advantages



Proven Reliability. Thousands of horsepower of Axi-compressors have been operating successfully in vacuum service for many years. Designed for higher pressures and heavier loads in compressor service, they have extra, reserve strength on *vacuum* service.

Compact Construction. Smaller in size than any other heavy-duty, high-capacity vacuum pumps, they are often the *only* units that can be installed in available space to increase the production of existing equipment.

Low Installation Costs. Axi-vacuum pumps can be mounted on smaller foundations and are more economical to transport and install than any other vacuum units in their pressure and capacity range.

Low Power Costs. Designed for high operating efficiency and direct connection to higher speed motors, they save on both operating cost and first cost of drive equipment.

Low Seal Water Requirements. Less than 1 gpm per 1000 cfm capacity provides ample seal for vacuums of 12″ Hg and higher. Lower vacuums require no seal water at all.

Greater Versatility. Any Axi-vacuum pump can provide a wide range of vacuum simply by changing the driver horse power. A unit installed for high vacuum, may be used on lower vacuum services and still maintain its high operating efficiency.

Low Maintenance. The two dynamically balanced rotor elements operate with no metal-to-metal contact, virtually eliminating mechanical wear.

Wide Range of Sizes. The large number of sizes permits meeting practically all vacuum requirements from a standard line. Each unit can be selected for actual inlet conditions, and changes in inlet temperature have little effect on capacity. Axi-compressors are available in capacities to 12,000 cfm for vacuums to 22″ Hg single stage and 26″ Hg two stage. Ask your I-R representative for complete information or write for bulletin 11,004.

Ingersoll-Rand

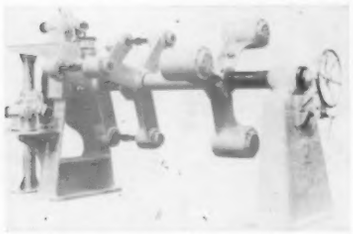
17-913 11 Broadway, New York 4, N.Y.

PUMPS • CENTRIFUGAL & RECIPROCATING COMPRESSORS • DIESEL ENGINES • AIR & ELECTRIC TOOLS • TURBO BLOWERS • STEAM CONDENSERS

New Equipment Section

Three-Arm Reel

. . . Lessens Interruptions



Applications: For reducing downtime on roll-handling operations.
Advantages: Unit is available for both shaft and shaftless applications; arms on shaftless model readily adjustable for varying roll widths, and both models feature latest indexing and interlocking devices.
Specifications: Unit features three pair of radial arms set 120° apart circumferentially; unwind pair being positioned 60° below horizontal and directly below the unwind. Third pair of arms for unloading finished rolls and loading new rolls is located on the horizontal.
Supplier: **Appleton Machine Co., 618 S. Oneida St., Appleton, Wis.**

Small Centriscreen

. . . Mirrors Big Brothers

Applications: For high-capacity screening on small Fourdrinier machines; for a single screen per mold on cylinder machines.
Advantages: Model 6 (a smaller counterpart of Models 14 and 10) is said to give "super-efficient" service at "low cost per ton." Continuous operation is featured—without screen plate breakage or erosion. Totally enclosed, it delivers stock to the headbox at desired pressure. Screen plates require no washing; volume of fresh water input is therefore reduced and higher stock temperatures permitted.
Specifications: The unit is 30 in. high, 34 in. in width and delivers up to 1,200 gpm clean, shive-free stock. It is entirely precision built of stainless steel.
Supplier: **Bird Machine Co., South Walpole, Mass., Tel. MOntrose 8-0400.**

Draw-Speed Recorder

. . . for All Applications

Applications: For controlling draw-speed and thereby avoiding costly paper breaks.
Advantages: The Dynamaster recorder makes it possible for an operator—knowing the speeds of couch and press rolls—to pinpoint trouble spots and adjust speeds to maintain proper tension.
Specifications: Recorder has a manual multi-point switch for recording selected draw, couch and press roll speeds; ranges are available for all applications. Added feature is a temper-proof compensator for roll diameter changes (allowing for wear, etc.). Unit is available for 120-v, 60-, 50- or 25-cycle supply.
Supplier: **Bristol Co., Waterbury, Conn., Tel: PLaza 6-4451.**

Insulated Storage Tank

. . . Heat Loss "Extremely Low"

Applications: Designed specifically for outside storage of pulps, chemicals and clays.
Advantages: There is no outside insulation and weatherproofing to maintain. Heat loss is reported to be extremely low. Freezing and clinging to inside surfaces is prevented, and tank remains operational at all times—"even with outside temperature at —35°F or lower".
Specifications: The Eskamo is constructed of reinforced concrete with acid- and alkaline-proof ceramic surfaces both inside and out. All insulation is placed between the walls. While cost is slightly higher than for an uninsulated tank, says the manufacturer, the amount is offset many times because need for housing is eliminated.
Supplier: **Service & Erection Co., 1673 Washington Rd., Pittsburgh, Pa.**

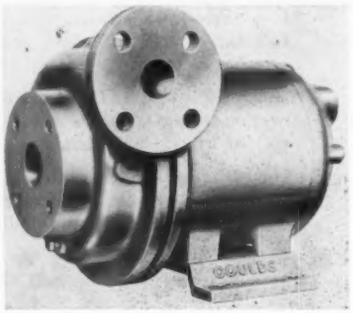
Bellows Flowmeter

. . . Accurate Within 0.5%

Applications: For both flow and liquid level applications.
Advantages: Differential pressure measuring unit is said to be accurate within 0.5% using no mercury, sealpots, purges or stuffing boxes.
Specifications: Meter body is completely self-draining and self-venting and is rated at 2,000 and 5,000 psig in steel and stainless. Flowmeter has ranges of from 0-20 to 0-300 in. water and may be easily changed. This indicating and/or recording instrument can be equipped with a controller, totalizer, or with a pneumatic or electric transmitter.
Supplier: **Fischer & Porter Co., 471 Jacksonville Rd., Warminster, Pa., Tel: OSborne 5-6000; and Fischer & Porter (Canada) Ltd., 2700 Jane St., Downsview, Ont., Canada, Tel: MElrose 3-9810.**

Seal-less Centrifugal Pump

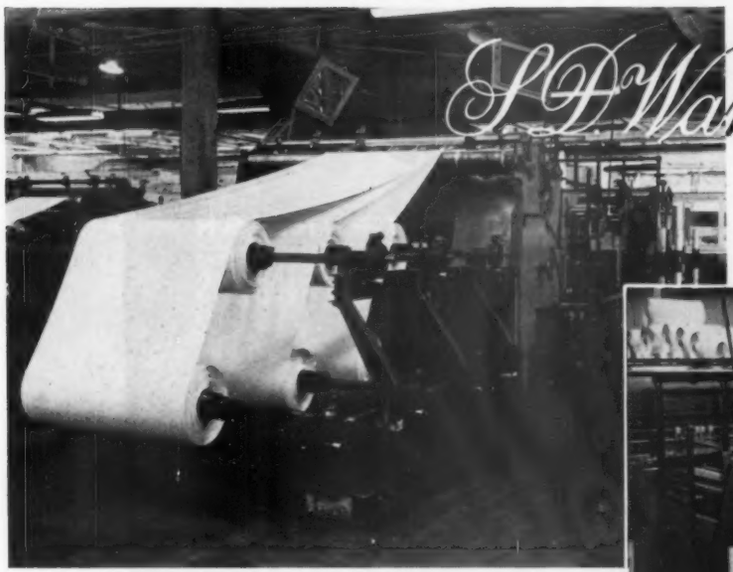
. . . "Positively" Leak-Proof



Applications: For handling volatile, toxic, inflammable or other hazardous liquids.
Advantages: The canned unit is leak-proof, since it has no mechanical seal, stuffing box or gland. These features result from combining motor and pump as an integral unit. Built-in thermal cut-out device protects motor in event winding temperature exceeds maximum safe limit.
Specifications: Built in two sizes (1- and 1¼-in. discharge), pumps have capacity range up to 110 gpm, heads up to 100 ft. and are recommended for handling clear liquids only. Motor and lubrication cooling is by circulating a controlled portion of liquid being handled through hermetically-sealed rotor housing and grooved housings. Units are regularly supplied in 316 stainless, but other materials can be furnished.
Supplier: **Goulds Pumps Inc. (ask for Bulletin No. 728.1), 203 Black Brook Rd., Seneca Falls, N. Y., Tel: 354.**

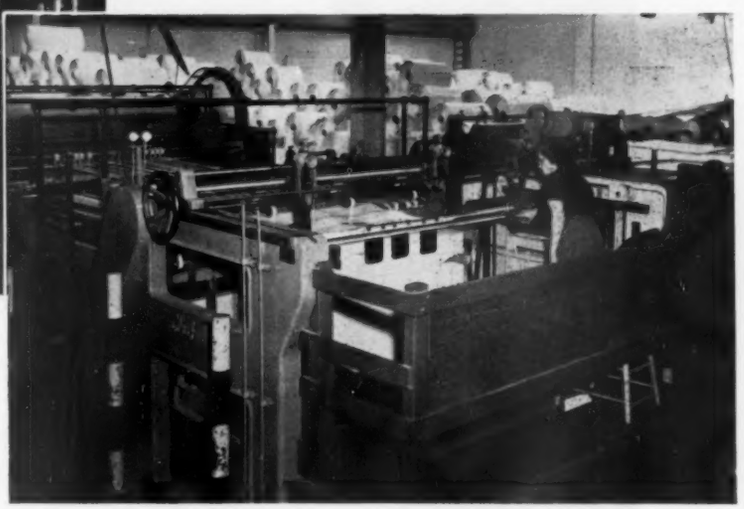
4 *Clark-Aiken* SHEETERS REPLACE 7

and more than double production at



S. D. Warren Company

CUMBERLAND MILLS, MAINE



CLARK-AIKEN machinery is keyed to fast, efficient finishing room production that saves TIME, SPACE and MONEY!

For the S. D. Warren Company, replacing seven machines with four new Clark-Aiken precision engineered sheeters was a wise investment that immediately paid off in production dividends. Tailored by Clark-Aiken engineers to fit their exact requirements, the new sheeters have more than doubled production. And just as important, they maintain high quality with extreme accuracy, require less plant space, give greater production control and eliminate unnecessary labor costs.

If the finishing room has your plant's production bottled up, a consultation with Clark-Aiken engineers can produce a solution that will answer your precise specifications. Their complete knowledge of the paper machinery field can help you realize the practical finishing room automation that will increase your production and lower operating costs. An inquiry to Clark-Aiken will bring you a considered and qualified recommendation.

MR. WALTER S. CARR, Finishing Department Superintendent, S. D. Warren Company, Cumberland Mills, Maine reports:

"We have four Clark-Aiken sheeters in our coated division. These four sheeters replaced seven previously used, and each one more than doubled the production over the cutter it replaced.

"These installations require less setting time because of easy accessibility to adjustments under the layboy.

"The 'Spiral Shear' cylinder knife leaves a clean edge and cuts twice as many sheets at one time as the previous type did.

"P. I. V. Units for changing type speeds give safe running at faster speeds."

THE *Clark-Aiken* COMPANY

957 SPRINGFIELD ROAD

LEE, MASSACHUSETTS

CANADIAN REPRESENTATIVE:
GORDON W. KEATES, 133 FLORA DRIVE, SCARBOROUGH, ONTARIO

UNITED® PAPER MILL ROLLS

NOW...

UNITED CAN FURNISH

- THE *LONGEST* ROLLS

AND

- THE *HEAVIEST* ROLLS

REQUIRED BY THE PAPER INDUSTRY

In Canada's Canoe Province it is recently completed steel mill with [illegible] that permit the production of rolls exceeding [illegible] in length and weight any presently used in paper manufacture.

This newest United facility, plus the most modern roll grinding and finishing equipment, is now available to meet the industry's maximum roll requirements. Quick delivery and strict adherence to rigid specifications are assured by United's complete facilities and more than 50 years' experience in roll design and manufacture.

When you are in need of rolls—for whatever requirement—phone or write us, without obligation, of course.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

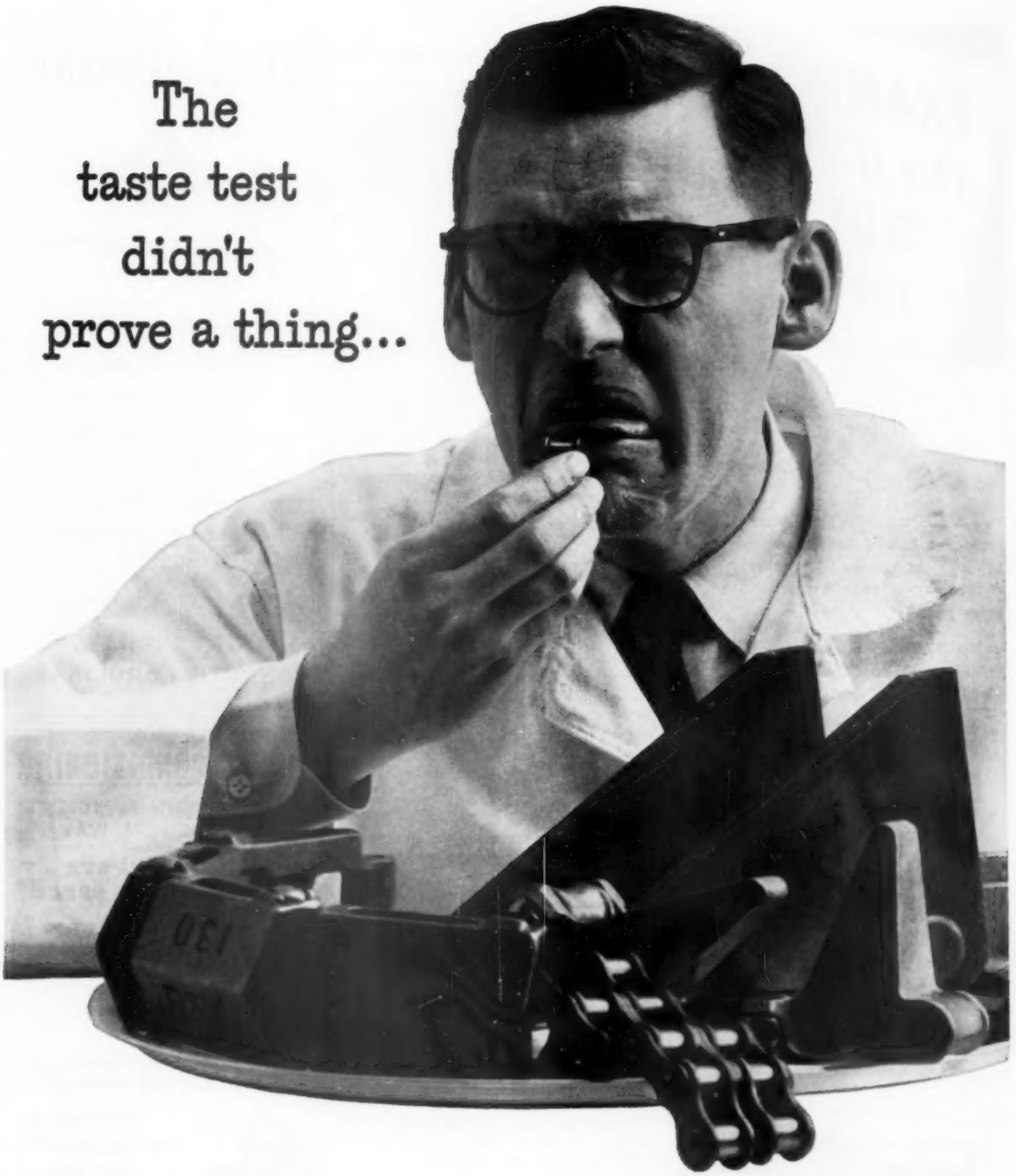
Plants at PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON • WILMINGTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO

STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

The taste test didn't prove a thing...



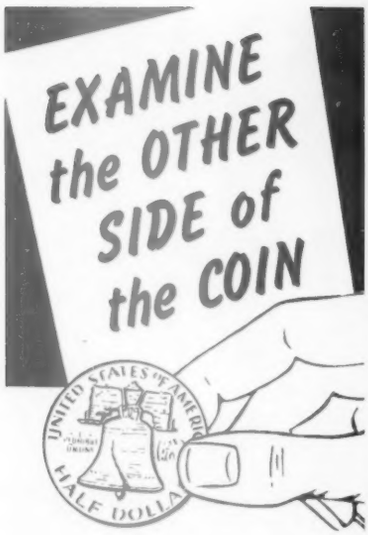
About all it proved was you can't pick a chain by its taste! Actually, to demonstrate the superiority of Rex Chains, we rely on the best test of all: the *user test*. Just check our claim with any Rex user. All we have to offer is unmatched quality... from log haul to finished lumber handling chains.

Ask your Rex Distributor or District Sales Engineer for the Rex Quality Story. CHAIN Belt Company, 4691 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: CHAIN Belt (Canada) Ltd., 1181 Sheppard Ave. East, Toronto.

REX®

CHAIN BELT COMPANY

REX IS BEST... IN THE USER TEST



You have been buying Multi-Metal facing wires and backing screens for cylinder equipment. But Multi-Metal makes many contributions to such other paper mill operations as

- **RAW WATER TREATMENT** by the use of NEVA-CLOG in demineralizers and softeners.
- **POWER PLANT CONDENSATE RECOVERY** with RIMLOK filter leaves and NEVA-CLOG.
- **WHITE WATER TREATMENT** with vibrating screens, separator re-screening and NEVA-CLOG in ion exchangers.
- **TRAP STRAINING** for resin recovery and product purity with custom-designed, complete strainers.

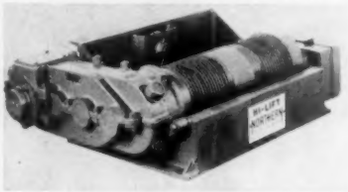
These and other interesting items will be discussed in the forthcoming Paper Mill Issue of "Multi-Matter." Send this coupon for your free copy.

MULTI-METAL WIRE CLOTH CO., INC.
1344 Garrison Ave., New York 59, N. Y.
Send me "Multi-Matter"

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

Hoisting Unit

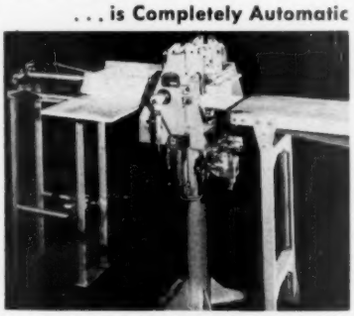
. . . Maximum Hook Lift



Applications: For paper mill reel cranes and special crane service.
Advantages: Built in a range of from 2- to 15-ton capacity, Hi-Lift is said to assure "maximum ease of mounting and minimum operating and maintenance costs". A foot-mounted motor driving through a flexible coupling permits the motor to be installed or removed without disturbing hoist mechanism. Long rope life is made possible by the large-diameter drum and sheaves. Entire hoist mechanism is "quickly and easily" exposed for inspection without removing gear case oil.
Specifications: The base-mounted unit features a plumb lift; standard rope types; machine-cut hardened steel gears and pinions; anti-friction heavy-duty bearings, and minimum height—therefore, maximum hook lift. Hoists available with single-speed, two-speed or variable-speed motors, or for alternating or direct current.
Supplier: **Northern Engineering Works, 210 Chene St., Detroit 7.**

Ream Rotator

. . . is Completely Automatic



Applications: To permit automatic reversal of sheets before wrapping in automated cut-size finishing systems.
Advantages: Unit can be set either to pass through or rotate the ream. It eliminates hand turning. Differing orders can be processed from same pallet load, with wire or felt side up as required.
Specifications: Maximum capacity is for sheets 9 in. wide, 15 in. long; maximum opening is 7 in. Featured are automatic feed, automatic clamping and roll-over, automatic discharge on a motorized belt conveyor.
Supplier: **Lamb-Grays Harbor Co. Inc., P. O. Box 359, Hoquiam, Wash.**

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Pulp & Paper Mills
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PAPER CONDITIONING

THE MODERN EFFICIENT ECONOMICAL WAY

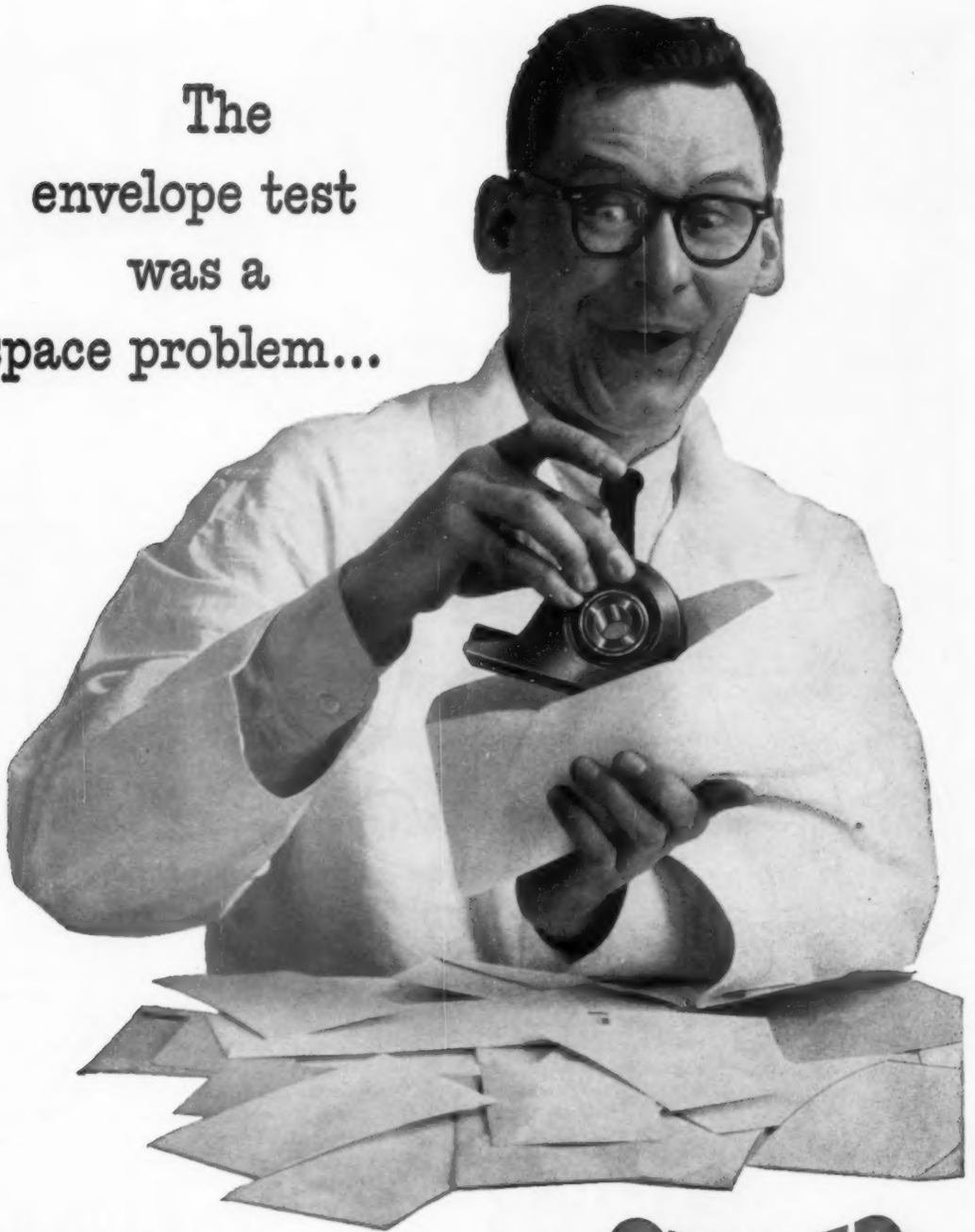
BUILT TO OPERATE AT ANY MACHINE SPEED

SYSTEMS ALSO BUILT FOR APPLYING SIZING MATERIALS, STARCHES, WAX EMULSIONS, PLASTICISERS AND OTHER SURFACE FINISHING SOLUTIONS

BUILT FOR MANUFACTURING OR CONVERTING PROCESSES

VAPO SYSTEMS
128-32 W. Home Ave.
Villa Park, Ill.

The envelope test was a space problem...



It took a little time to convince our test expert that "envelope" was high-type engineering vernacular for over-all housing dimensions. Once we got through to him, the rest was easy.

Shafer Roller Bearings just naturally require less space without any sacrifice in load capacity. The housing is designed so that it is both strong and compact. The Shafer self-aligning concave rollers and convex races permit lower, more compact housing profiles.

Ask your authorized Shafer-Rex Salesman. CHAIN Belt Company, 4691 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: CHAIN Belt (Canada) Ltd., 1181 Sheppard Ave. East, Toronto.

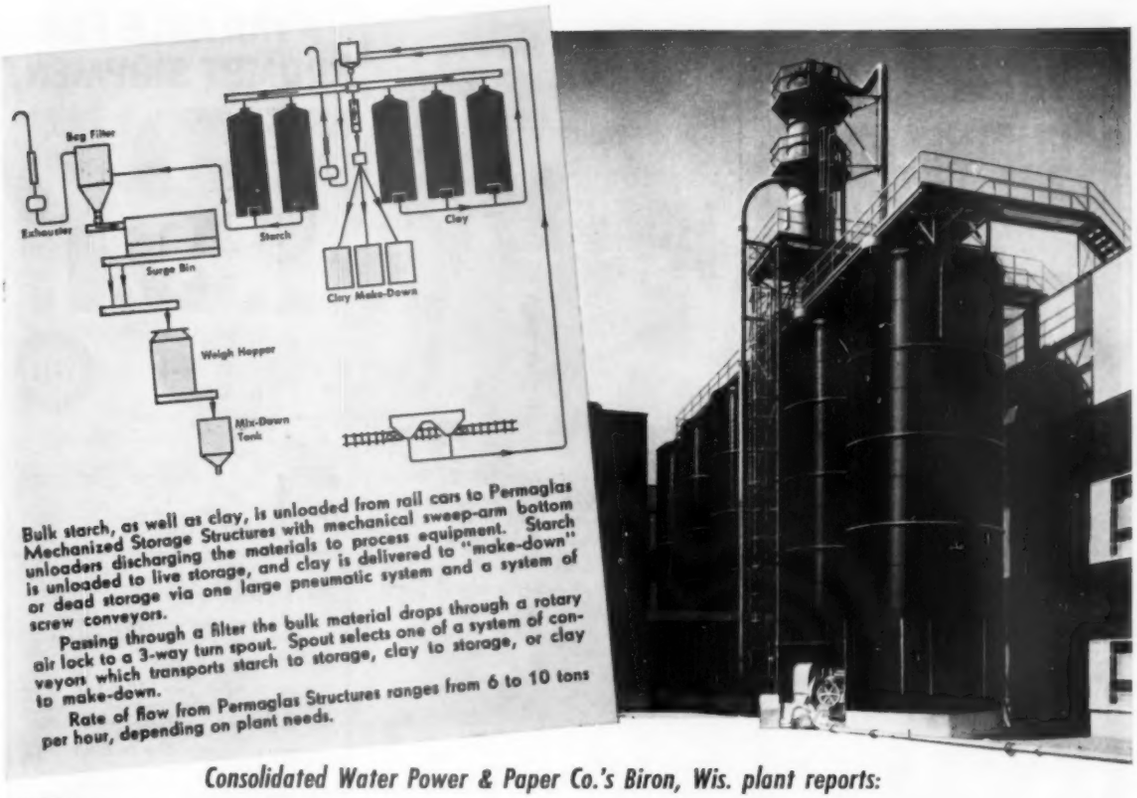
SHAFER®
REX®
CHAIN BELT COMPANY

SHAFER REX IS BEST... IN THE USER TEST

leading manufacturer of
wires for KRAFT PAPERS

APPLETON WIRES
ARE GOOD WIRES

APPLETON WIRE WORKS Corp. PLANTS AT APPLETON, WIS. AND MONTGOMERY, ALA.: INTERNATIONAL WIRE WORKS, MENASHA, WIS. AN AFFILIATED COMPANY



Bulk starch, as well as clay, is unloaded from rail cars to Permaglas Mechanized Storage Structures with mechanical sweep-arm bottom unloaders discharging the materials to process equipment. Starch is unloaded to live storage, and clay is delivered to "make-down" or dead storage via one large pneumatic system and a system of screw conveyors.

Passing through a filter the bulk material drops through a rotary air lock to a 3-way turn spout. Spout selects one of a system of conveyors which transports starch to storage, clay to storage, or clay to make-down.

Rate of flow from Permaglas Structures ranges from 6 to 10 tons per hour, depending on plant needs.

Consolidated Water Power & Paper Co.'s Biron, Wis. plant reports:

"Permaglas® Mechanized Storage System—low-cost way to handle and store bulk starch and china clay"

Here's another outstanding *Permaglas* Mechanized Storage System that is paying big dividends every month from actual savings achieved from automatic, bulk handling and storage of dry starch, and also china clay.

This Wisconsin paper manufacturing company uses two 17′ x 50′ and three 20′ x 50′ *Permaglas* Units with the exclusive A. O. Smith mechanical sweep-arm bottom unloader making possible a completely automatic vacuum system which assures dependable, continuous flow of bulk starch and clay. Two *Permaglas* Structures hold 20,000 cu. ft. of starch, while the other three store a total capacity of 42,000 cu. ft. of clay.

The principal reasons for installing and using the *Permaglas* Units are the ease in handling of the raw materials and cost savings realized from bulk storage. Other benefits enjoyed include substantial reduction in manpower needs . . . economies in bulk purchases rather than in bags . . . saving of inplant storage space for other productive uses . . . increasing production efficiencies . . . preventing hazardous accidents with safer and cleaner plant.

What's more, the *Permaglas* Structures are glass-fused-to-steel construction both inside and out. They provide utmost protection against contamination . . . simplify "bin wash-downs" . . . reduce periodic structure maintenance to a minimum.

If your plans call for an automatic bulk materials handling system — vacuum, pressure, or combination vacuum-pressure—be sure to contact A. O. Smith. We are at your service, prepared to make recommendations for a completely automatic *Permaglas* System. For more information fill in and mail coupon today.

Through research . . . a better way

A.O.Smith
CORPORATION

HARVESTORE PRODUCTS
KANKAKEE, ILLINOIS
A. O. Smith International S. A., Milwaukee 1, Wis.

A. O. SMITH CORPORATION
Permaglas Storage Units, Dept. PP-50
Kankakee, Illinois
Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.
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Company.....
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VALUE ENGINEERING PROVES

ROCKWELL *Resilient-Seated* Butterfly Valves *STAND OUT*

- Weigh Less—Cost Less
- Need Less Space
- Easier to Install
- Always Operable
- Low Pressure Drop
- No Fouling
- Negligible Maintenance
- Simplified Control —Manual or Remote

Bodies lined with any elastomer—from natural rubber to Viton.

Construction of any metal.

Operates from simple lever to automatic and remote control. No limit in size.

Let Bulletin 590X help you put value engineering to work on your valve applications. Just mail the coupon below.

W. S. ROCKWELL COMPANY
2510 Eliot St., Fairfield, Conn.

Send me Bulletin 590X.

Name .....

Title .....

Firm .....

Address .....

City ..... State .....

Metal Edger
. . . 150 Cartons per Min.

Applications: For supplying metal tear edge or strip to cartons for foil, waxed paper, etc.
Advantages: Versatility allows tear strip application to either the edge or one panel back of a carton blank. Control console and power motor are incorporated within a single frame unit. When edger is used in conjunction with Faustel dies, manufacturer guarantees production speed of 150 cartons per min. Carton changeover is said to be possible in 15 min., die changes in 30.
Specifications: Series "C" handles all size carton blanks from 7 to 24 in.; Series "D" from 8 to 30 in.
Supplier: **Faustel Inc., 5109 N. 125th St., Butler, Wis.**

Texas Gulf Issues New Sulphur Manual

Texas Gulf Sulphur Co., Inc. Sales Dept., 75 East 45th Street, New York 17, N.Y., will send on request a new comprehensive "Sulphur Manual," or any of its sections.

Because of the rapidly growing interest of the industry in getting supplies of sulphur in molten form, the company has devoted two sections to this subject alone. The manual is divided into four sections, and an appendix, as follows:

Section I—"The Sulphur Industry." An up-to-date discussion of the world-wide industry.

Section II—"Shipping of Molten Sulphur." Texas Gulf details its own experiences and recommends certain procedures.

Section III—"Handling and Storage of Molten Sulphur." Detailed instructions on how to take care of molten shipments and how to set up storage facilities.

Section IV—"Analysis of Sulphur." Latest analytical methods for checking the purity; best methods of sampling solid and molten sulphur.

Appendix A—"Physio-Chemical Properties of Sulphur." Review of all the properties with latest proved determinations.

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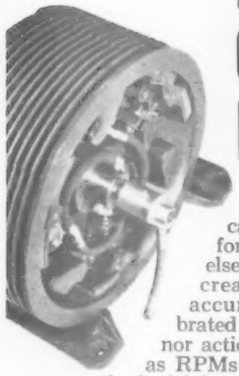

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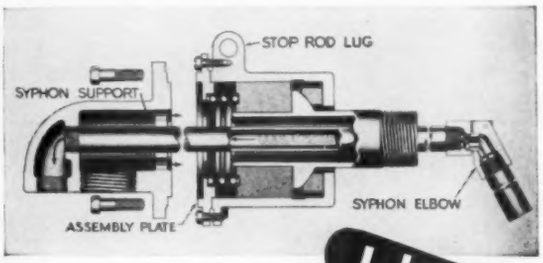

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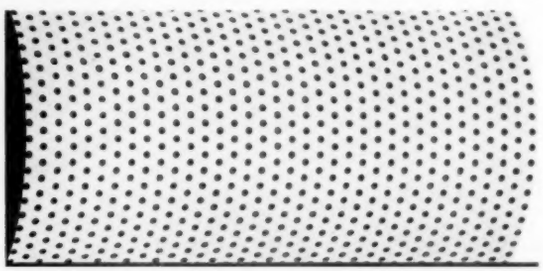

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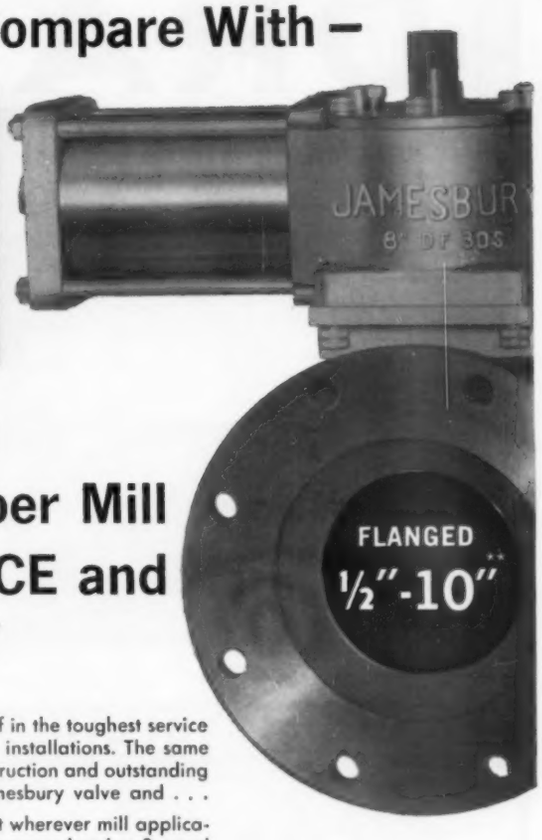

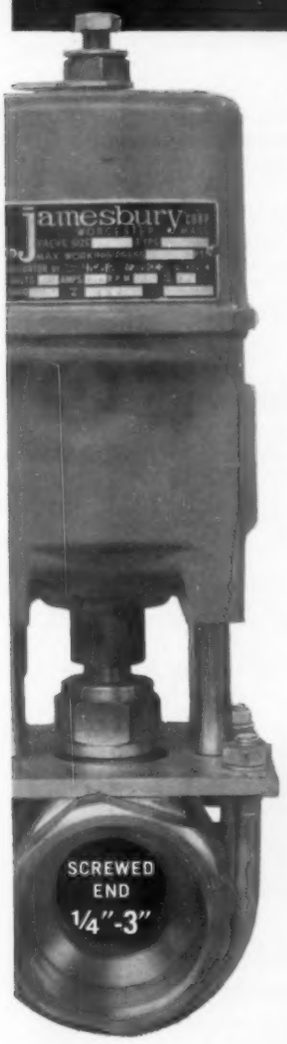

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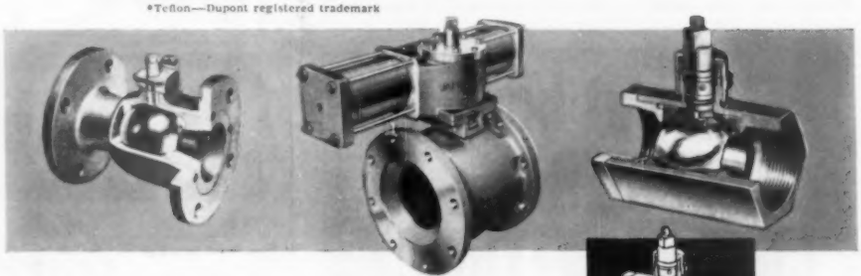

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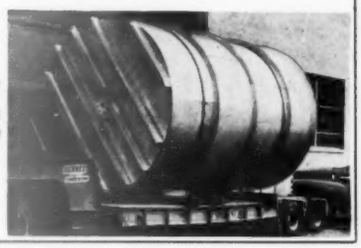

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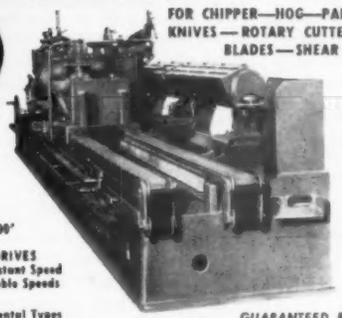

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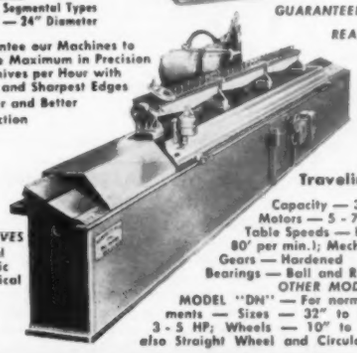

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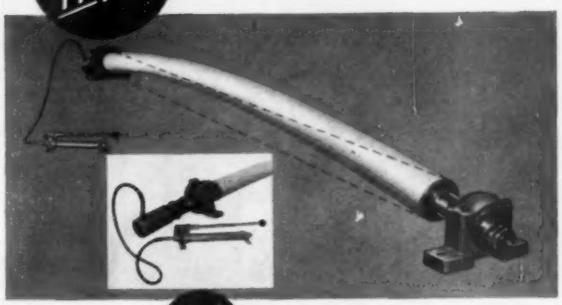

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The Last Word PULP & PAPER Editors' Page

The Pulpwood Annual

No matter what your area of interest in this industry, we earnestly urge a careful reading of this year's PULPWOOD ANNUAL featured in this issue. Not only are this year's paper excellent, but there are many ideas sprinkled throughout the pages which bear studying.

Possibly the most disturbing is the recent proposal known as the Wilderness Bill which would lock up some 50 million acres of Western timber lands alone, plus many more million acres of timber in other areas. We believe that W. D. Hagenstein, executive vice president, Industrial Forestry Assn., Portland, Oregon, puts it rather succinctly. "It is no laughing matter. There is a serious drive by a small dedicated minority who believe a law must be enacted to protect a significant portion of Western federal lands for roadless wilderness. . . . Congress has too much sense to weaken our economy in any way by reducing our natural resource base when it fully knows that our enemies are dedicated to the proposition that food and materials are much more important in the struggle for world domination than fun." Wilderness bills would lock up these areas forever and prohibit them from being developed.

Perhaps some of the ideas behind such legislation and as well as the host of others you will notice that the APA has on their agenda (page 99 stem from an inadequate knowledge (who's to blame, we don't know) on the part of the public concerning the industry. How many people for instance realize that the industry as a whole grows more trees than it cuts or that annual growth exceeds annual cut? How many of the people in the street, the ones to whom the so-called conservationist seem to have so much appeal, truly know of the outstanding tree conservation programs this industry sponsors?

In another area, as you read the PULPWOOD ANNUAL you will get a good overall picture of what the problems are to the fellows in the woods. You will get a better insight into their thinking of roundwood versus outside chip storage in the South and also the Northeast which is picking it up fast.

They say that the cost of wood is the single, largest raw material cost in this industry and that one of the major areas for cost reduction is in from the stump to woodyard. Here is where there is much concentrated effort and in the regional reports by mill men and APA forest engineers you will see how they are trying every conceivable idea that sounds good.

As another author in the PULPWOOD ANNUAL puts it, management must consider the whole picture—not just from the finished paper product to the mill but all the way back to the forest and this, he says, includes fire control and fire prevention research.

P & P Honored

It is a pleasure to report that one of our staff written stories has been selected by Fraser Paper, Ltd. to appear in their Graphic Arts Progress 1960. The article is "Up, Up Goes Coating," and was published in PULP & PAPER, July, 1959. Writes James S. Lyndes of Fraser, "We are indeed happy to confirm that our panel of judges has selected an article from PULP & PAPER to be included in Graphic Arts Progress 1960.

"Both the judges and ourselves admit that it was a difficult task to choose the best 25 articles from the more than 150 excellent choices submitted by the editors." As best we can remember, this is the fourth time we have been honored by such a selection and we sincerely thank Fraser Paper for so singling us out.

Another Poem by "Sapiens"

Editor. The enclosure is sent as a token of gratitude for your imaginative tribute in the March issue of PULP & PAPER, and as a token of friendship.

Dr. Louis E. Wise
Senior Research Associate
The Institute of Paper Chemistry
Appleton, Wis.

Early Spring in Appleton

T'is Spring, so says the almanac;
And yet the ground is patch-worked, here and there with snow.
Perhaps new snows are in the air.
The trees, tangling my hill, are skeletons and bare,
And through their jungled network,
On the Eastern river bank, we see
The sulfite mill, for acres flanked
By storied piles of unbarked pulpwood.

A new steel bridge, which spans the River Fox,
By day is gleaming orange
(Still carrying its coatings of red lead).

And at night the span's illuminated
By high and garish lamps,
Whose greenish glare is mirrored
In the ripples of the stream,
Competing, on clear nights, with pale reflected moonlight.

And, in the distance, brilliant red and bright green lights
Alternately wink and change.

T'is then the mill, so drab in daylight,
Becomes a palpitating thing of beauty.
It too has lights, some yellow and some blue.

Its everlasting cooks go on,
As ghostly wisps of smoke
Dissolve into a blue-black sky.

And then, at dawn, the mill is stark again,
A silhouette against the pink and pale blue of the morn.

Sapiens.

Editor's Note: We are proud to publish Dr. Wise's tribute to Appleton in springtime. The by-line of this 1960 winner of the TAPPI Gold Medal is—as so many of his friends know—"Sapiens".

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